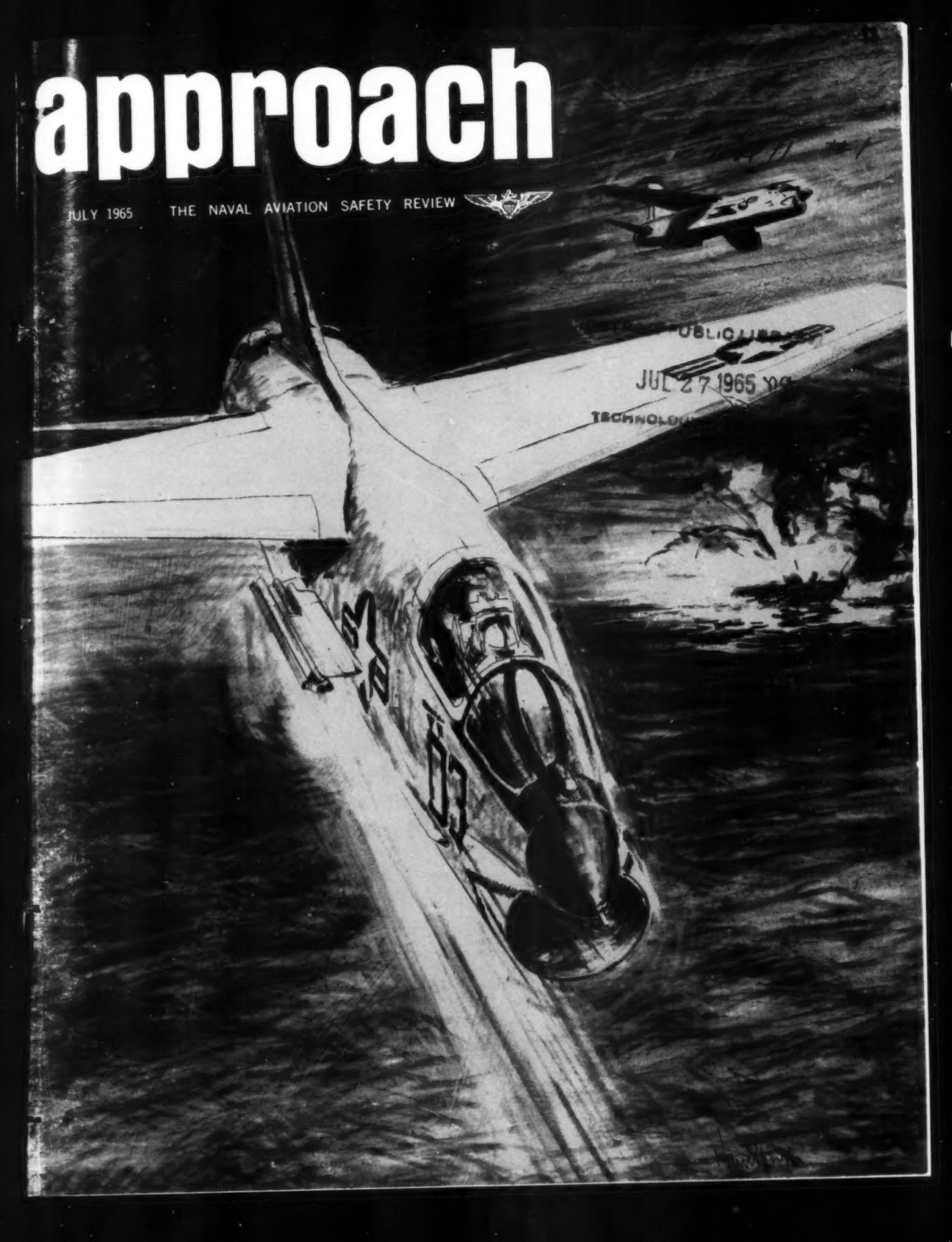
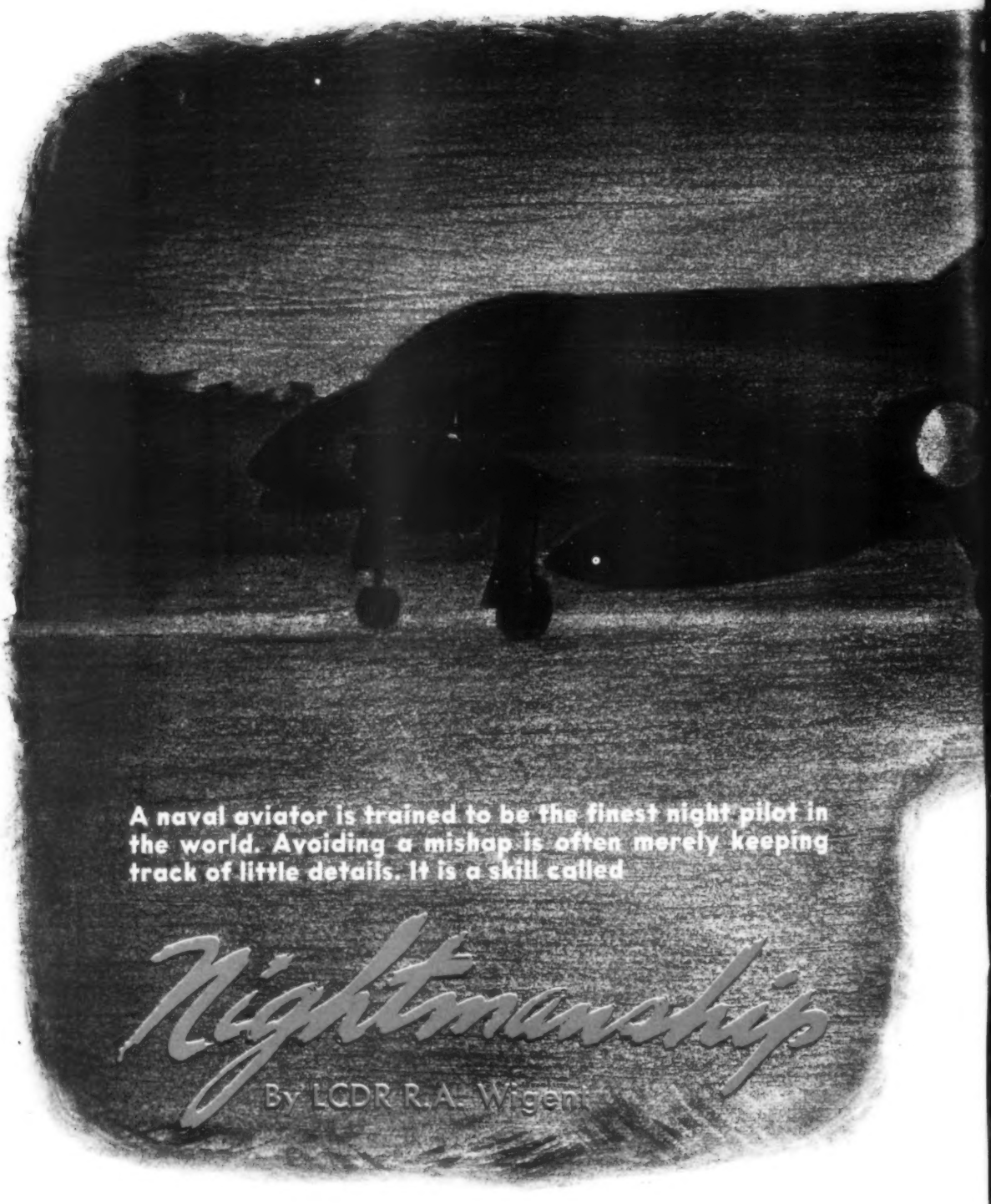
approach

JULY 1965 THE NAVAL AVIATION SAFETY REVIEW

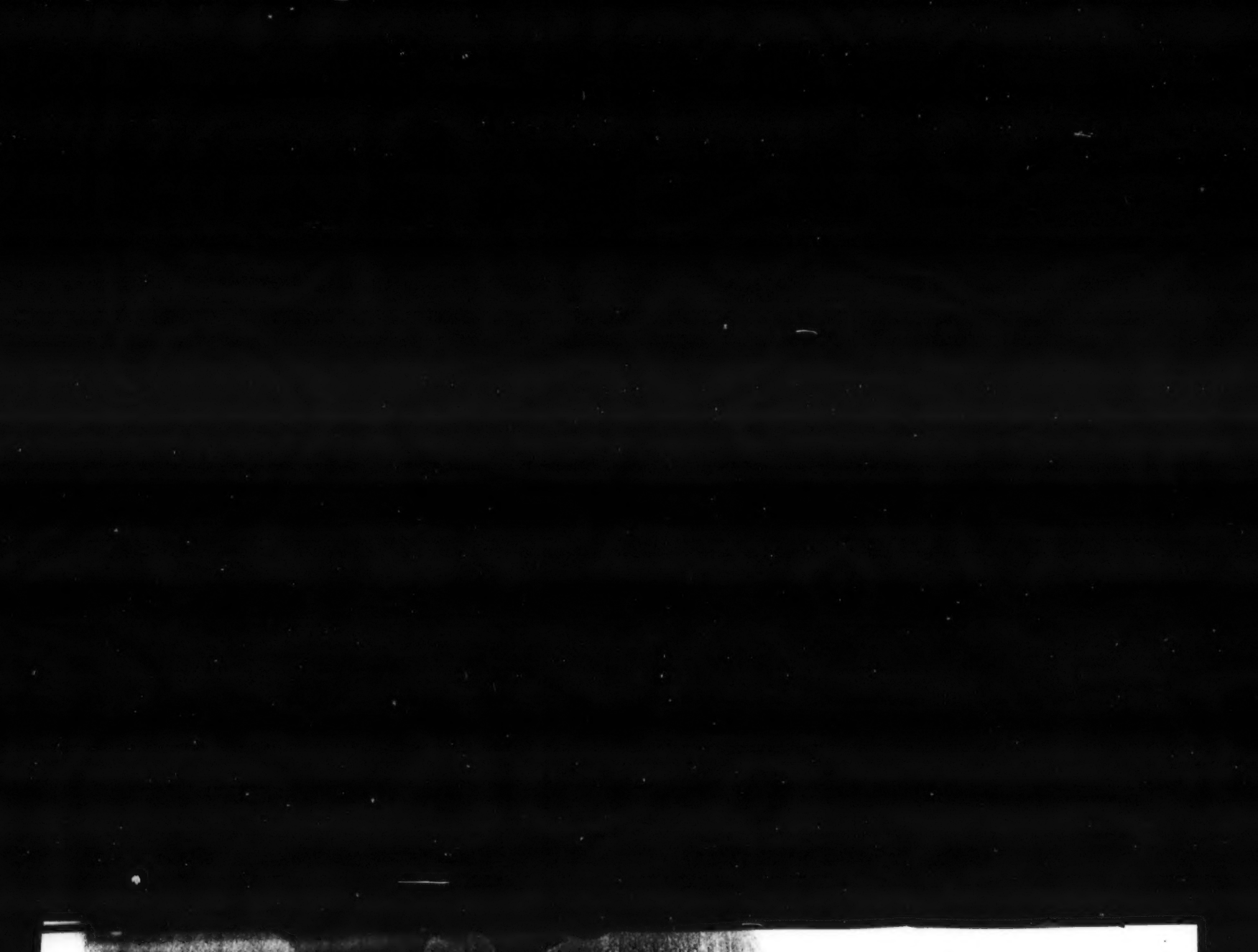




A naval aviator is trained to be the finest night pilot in the world. Avoiding a mishap is often merely keeping track of little details. It is a skill called

Nightmanship

By LCDR R.A. Wigen



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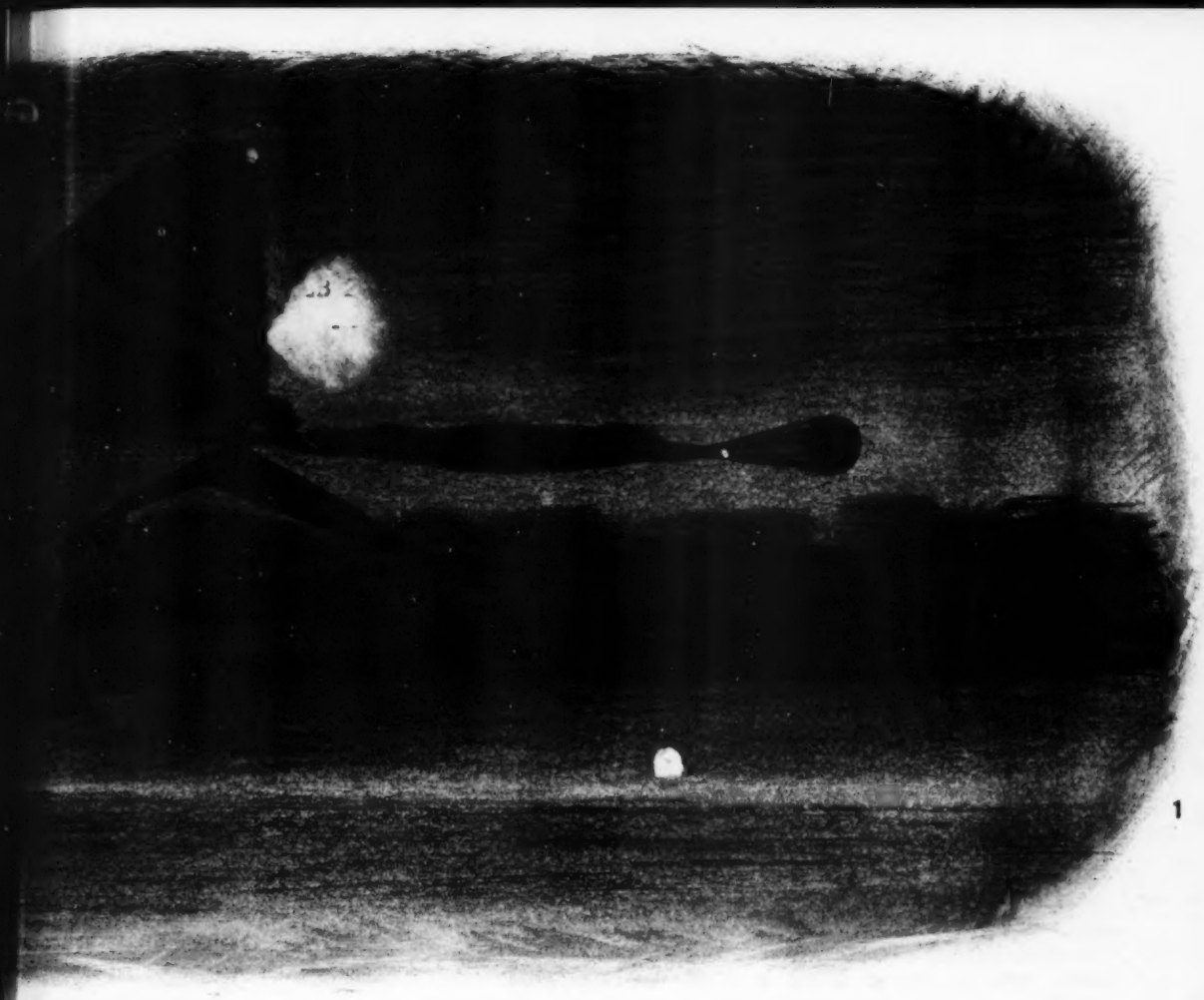

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A *Phantom II* steamed up the groove and landed in the first 200 feet of runway. Immediately after touchdown, the drag chute deployed and the aircraft started decelerating rapidly—the anticollision light was not on and the external lights were on DIM.

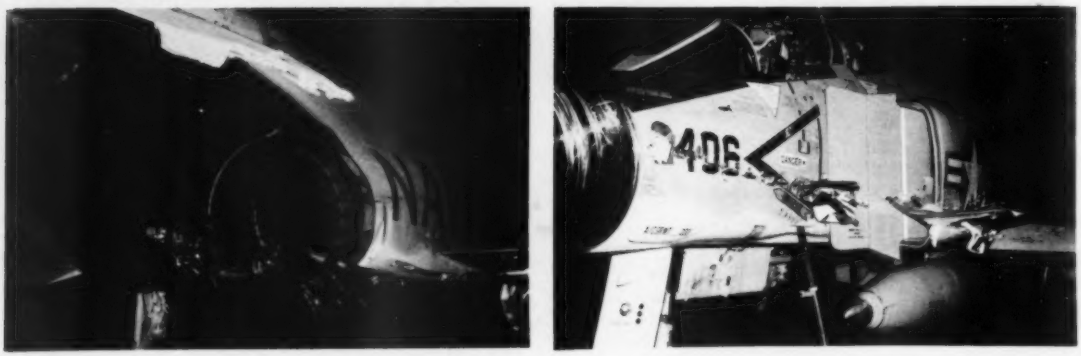
The pilot had been the leader of a two-plane flight. When the wingman separated from the flight, out in the operating area, the leader forgot to reset the light switches to BRIGHT. With the lights on DIM this also meant that the anticollision light was not operating.

The dimly lit *Phantom* completely disappeared within the maze of runway lights. Even the dim taillight was obscured from view by the drag chute when it deployed.

About 6000 ft down the runway, the airplane had been braked to turn-off speed. Upon sighting an approaching taxiway, the pilot called, "Turn off at 10."

The tower answered "Negative" and advised him of another F-4 closing rapidly from astern. "Where the @#$%c&*! did he come from?" the pilot thought as he added power to roll to the end of the runway for turn off.

The second F-4 had been shooting FMLPs on the left parallel runway when he heard tower instructions on the LSO/bounce pattern frequency to



F-4 at left was struck from the rear by F-4 at right, which has a section of leading edge flap impaled on the intake duct.

terminate FMLP since weather was moving in. Acting solely on the intercepted instructions, the pilot switched to tower frequency and started setting up his pattern for the regular duty runway—the right parallel.

Reporting his position abeam, the pilot requested landing clearance for the right runway. He was cleared to land and acknowleged his landing interval—an F-4 ahead of him.

While on base leg, the tower asked if he could modify his pattern to land on the left runway where the rest of the FMLP aircraft were landing. Already committed to the right, the pilot answered "Negative." It was during the discussion with the tower that the pilot of the second F-4 lost sight of the dimly lit aircraft ahead among the maze of lights around the field. Turning onto final he *thought* he momentarily saw the aircraft ahead at a safe interval landing on the far right side of the runway centerline (the first F-4 actually landed on the left side).

The second *Phantom* touched down on the left of runway centerline—a bit fast and slightly heavy. To make matters worse, the drag chute deployed slightly late since it didn't release on the first try.

Although unable to distinguish any aircraft lights ahead, the second F-4 pilot thought he was maintaining a good interval when he heard the first one call "Turn off at 10." When he heard the tower's warning to the other aircraft, he started heavy braking.

Still no lights!

Finally, the pilot in the second F-4 saw the silhouette of the other *Phantom* when it was only about 200 ft ahead.

Immediately upon sighting the aircraft, the pilot hit hard right brake—commencing a right swerve. The pilot was attempting to increase the right swerve with nosewheel steering when the collision occurred.

Both aircraft became momentarily enmeshed. After considerable ripping and tearing of metal, divergence occurred. Both aircraft skidded to a halt still on the runway—there was no fire. Engines were shut down; pilots and RIOs evacuated the aircraft.

The multiple factors involved in the accident were summed up by one of the AAR endorsers as follows:

"Although a breakdown of radio discipline, air traffic procedures and adverse weather were present as contributing factors, it was still the responsibility of the pilots in actual control of the aircraft to exercise proper judgment. The pilot of the second F-4 exercised poor judgment in continuing his approach and landing after having lost sight of the aircraft ahead. The pilot of the first F-4 used poor headwork in maintaining his lights on DIM while in the traffic pattern. In addition, his apparent disorientation on the runway added to an already confused situation."

Confusion appears to some extent in nearly all night field accidents. It seems to set the stage for the mishap. Accident reports indicate that crowded traffic conditions, multiplicity of traffic patterns, break down of radio discipline, unexpected adverse weather, failed equipment, and breakdown of air traffic procedures are the main contributors to confusion. A hazardous situation develops simply because of a group of circumstances. In the daytime we can see these situations in plenty of time to avoid a mishap. At night it's a different story. It's a case of nightmanship.

Nightmanship is a label I use to describe a special pilot skill evolving around the operation and control of aircraft in the landing pattern at night. It's a group of special habits, procedures and techniques relied upon to compensate for our visual losses after the sun has gone down. To some people, this skill is called common sense. Unfortunately, what is common sense to one person isn't necessarily so to

another. This may perhaps give a clue as to why some have accidents and others don't.

Let's take a look at some additional night accidents that have occurred around the air stations and see if some axioms can be established from them. GCA (actual or practice) and Mirror Landing Practice Patterns are purposely not covered except when they contribute to a mishap occurring in the normal VFR pattern.

One significant point noted in studying these accidents was the excessive number of causal factors involved in each mishap. These factors are often so intertwined that it is extremely difficult to separate the "wheat from the chaff" in determining which one is primary.

Landing Interval

If every airplane landed at the same speed and distance down the runway, decelerated at the same rate, then turned off at the same place there would be no hazard. Such is not the case.

Variations exist in individual pilot techniques, deceleration rates vary between aircraft, and material failures do occur. How hazardous the situation is will often depend upon the landing interval. What is a good interval?

• In the original F-4 night runway collision cited, the second F-4 landed about 3500 ft behind the first one. Normally this would have been enough. Hard premature braking by the pilot of the first F-4 reduced this interval. To reduce it further, the second F-4 landed fast and heavy after losing sight of the airplane ahead, then experienced drag chute problems. It would be difficult to calculate just how much landing interval would have been needed to avoid this accident.

• Another F-4 touched down about 5000 ft behind an F-8 that was rolling out after a GCA (on GCA frequency). Upon actuation, the F-4's drag chute failed to deploy. Since there was 12,000 ft of runway—no sweat. The pilot decided to brake the aircraft to taxi speed.

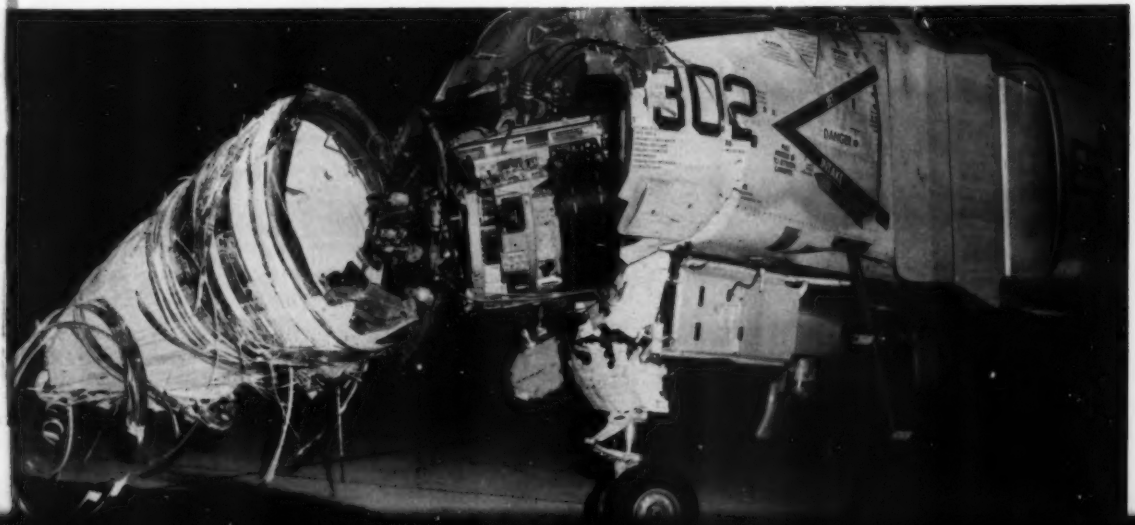
Struck from the rear during an early turn-off.

Although the F-4 pilot was aware of the F-8 ahead of him, he was unable to locate it in the maze of lights. The F-8's tail light blended in too well with the runway lights to be seen—the *Crusader's* rotating anti-collision light had been turned off in the clouds and then forgotten.

Nearing the 10,000 ft turn-off, the F-4 pilot finally saw the F-8 broadside directly in front of him from the reflection of his own anti-collision light. Efforts to avoid collision were futile. The F-4 hit the tail section of the F-8, spinning the *Crusader* around for several turns.

• A B-26 was landing hot on the heels of an S-2

The F-4 had a drag chute failure. There was no problem until the aircraft ahead turned off early.



that was rolling out. The tower, in an effort to clear the runway, requested the S-2 pilot to expedite roll-out and cleared him for the first available turn-off.

Immediately the S-2 commenced heavy braking—angling over to the B-26's side of the runway—which was also the turn-off side. Unable to slow sufficiently to make the first turn-off, the pilot advised the tower that he would continue to the second turn-off. Hearing this, the B-26 pilot hit the binders hard. The port tire blew first, followed by the starboard one. The aircraft left the runway amid a spectacular shower of sparks and fire emitted from the skidding and sliding mainwheel rims.

The two aircraft met in the middle of the second turn-off taxiway.

It is probable that the only really positive means of preventing accidents of this type is strict conformance with paragraph 423.1 of the Manual of Air Traffic Control Procedures (ATP 7110.1B) which says that before the landing aircraft crosses the approach end, the preceding aircraft must have taxied clear of runways. In practical application this would impose a burden to efficient air station operations. Consequently, OpNav Inst. 3722.24 provides for reduced separation for combat type aircraft at Navy/Marine Corps activities. The determination of a reduced landing interval rests with the pilot unless a local air station directive establishes specific intervals.

Premature braking by the first aircraft tends to turn an interval of reduced separation into a definite collision hazard on the runway at night. This, combined with the difficulty of keeping sight of aircraft lights against a lighted background of runway and taxiway lights compounds the hazard further.

The practice of short turn-offs, especially at night, is open for considerable argument. Endorsers of the accident reports involving jet aircraft were unanimous in stating that jet aircraft *should roll to the end of the runway for final night landings unless specifically cleared earlier by the tower.* Pilots should not initiate the request to turn off the runway early.

The B-26 (upper left) collided with the S-2 in the middle of the second turn-off taxiway.

Distractions Outside the Cockpit

Normally, distractions cause little trouble other than diverting a pilot's attention for a few moments. However, when this happens at a critical time, it can be fatal.

• An F-8 was cleared on tower frequency to expedite crossing the duty runway. As the aircraft started across, nosewheel steering failed. The pilot stopped the aircraft with the nose about five feet onto the runway and advised the tower of his problem. The tower acknowledged and stated that they would close the runway after the landing aircraft rolled out.

Upon observing the bright landing lights of a transport landing on another runway, he assumed that this was the "aircraft rolling out" referred to by the tower. As a result, the pilot advised the tower that he was able to taxi across the runway and would hold clear of the runway on the other side. The tower's "Roger" was misconstrued as clearance to cross. About halfway across, the *Crusader* was hit from the side by another F-8 rolling out at about 40 knots.

Although the lights of each aircraft were visible, neither pilot was aware of the other's presence until a split second before impact. The landing F-8 had a radio malfunction and was talking to the tower on ground control frequency.

• An A-4 had entered the FMLP pattern and was just approaching the 90-degree position when he was informed of GCA traffic (a flight of 2 A-4s) at about two miles. The pilot acknowledged, stating, "They appear close."

The A-4 started to descend immediately. At the precise moment the LSO started transmitting urgent climb calls, the GCA traffic checked in with the LSO for FMLPs—blocking out the LSO. The aircraft impacted shortly thereafter, about 1⅓ miles short of the runway. The board believed that the pilot allowed the aircraft to settle to the ground while looking at the two aircraft entering the FMLP pattern. Poor radio discipline and nonstandard air control procedure (aircraft joining the FMLP pattern from a GCA waveoff) were also factors in this accident.

Preoccupation Within the Cockpit

Concentration of attention to cockpit details can also be deadly—especially at critical times at night. Following are three examples:

• An A-4 took off for a VFR climbout. At an estimated 1000 ft altitude, the aircraft entered a right descending turn. The wingman, who was joining up, made several calls to "Check your altitude." The aircraft crashed with no perceptible change of attitude, answering transmission, or pilot ejection. Examination of aircraft wreckage and interrogation of witnesses did not reveal evidence of material failure or an inflight fire. The engine was running at a high percent when the plane hit.

The board believed that the most probable cause of the mishap was that the pilot flew the aircraft into the ground while attempting to make a manual frequency change at low altitude.

• A night afterburner takeoff appeared normal until the F-8 reached about 200-300 feet of altitude. At that point, the airplane settled into the river off the end of the runway—still in burner.

Wreckage examination indicated that the airplane hit with the gear up, wing down and the cruise droops out. The board believed that the pilot was preoccupied with cockpit procedures to the point that he allowed the airplane to fly into the water.

• A flight of three A-4s entered the break in right echelon. The leader's lights went to BRIGHT/FLASHING simultaneously as he broke. Three seconds later (NATOPS *day* break interval) the wingman broke. The wingman had his head in the cockpit checking the position of his external light switches when he looked up and observed that he was rapidly closing on the leader. Rapid evasive maneuvers by the wingman failed to avert a midair collision.

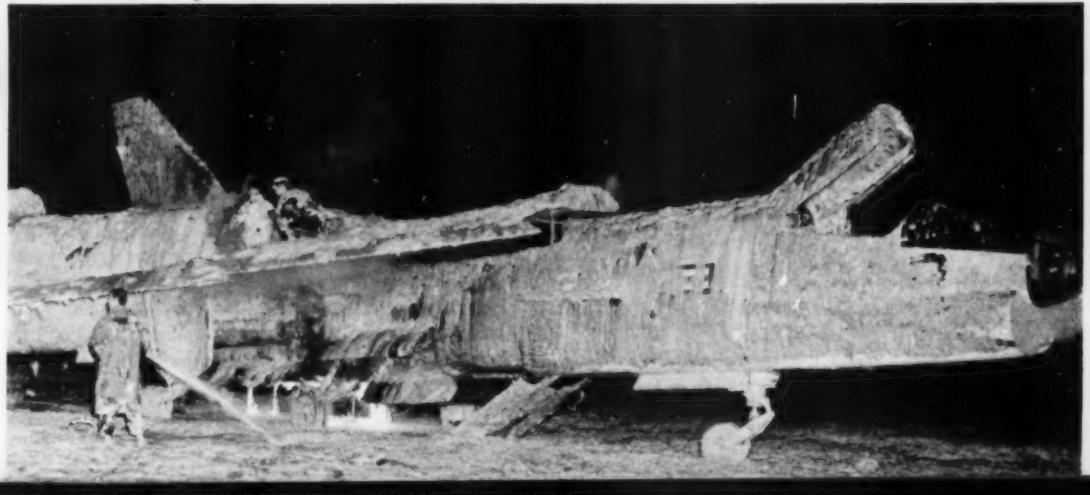
Shutting Down on the Runway

Sometimes it is desirable for one reason or another to shut down an aircraft on the runway. Usually the tower is well aware that this is about to happen and closes the runway.

Where's the problem then? The problem exists in the newer jet aircraft that do not have batteries.

In case of a flameout or inadvertent shutdown of an engine on the deck, the first indications are when

The word "Roger" means "I understand." In this accident it was misconstrued as "clearance to cross the duty."



the lights go out and the radio goes dead. There the airplane sits—no radio and no lights to insure that the tower even knows where it is.

Remote? Maybe, but here's an accident that illustrates the case in point:

• Immediately upon touchdown the pilot of an F-8 observed the cockpit lights fail and the radio go dead. He had inadvertently moved the throttle to OFF at touchdown and the engine flamed out.

After the *Crusader* rolled to a stop, the pilot unstrapped and evacuated it. Twelve minutes later, the pilot frantically tried to catch the attention of another F-8 pilot with his flashlight as he went by the stalled plane during the landing rollout. A KC-130 landed next but turned off short. As it turned off, the plane's landing lights illuminated the stalled *Crusader*.

Several minutes later, the pilot noticed another F-8 on touchdown and rolling out. Flashlight signals were of no avail.

Prang! The *Crusader* collided with the stalled plane on the runway.

How did this happen?—Especially since the two airplanes landing before the collision reported a stalled F-8 on the runway? The tower confused the airplane reported with another one that was being towed back from the end of the runway!

Although the tower had let the stranded pilot down badly in this case, perhaps the pilot could have commanded a bit more attention by lighting a survival flare or by sending up a little flak from his .38.

Tower

Considering the amount of traffic around some air stations at night, air controlmen have done a very commendable job.

Basic duties and responsibilities of tower personnel are stated in the Manual of Air Traffic Procedures (ATP 7110.1B). Each air station normally supplements or modifies these instructions in order to tailor them to meet the local situation (terrain, noise abatement, special military requirements, etc.). Usually these are located in the station Air Operations Manual. Since these directives are quite detailed and comprehensive, I shall not attempt to summarize them here.*

As previous accidents indicate, there are some isolated problems related to tower control of aircraft.

The first one has to do with aircraft lights. In three of the accidents there was a good possibility

* For those that are interested in a discussion of the air controlman's problems, may I suggest reading "Traffic Pattern Doctrine" or "Midairs in the Traffic Pattern" (APPROACH —Feb '63) or "Tower Times" (APPROACH —May '63).

Midair collision 1500 feet from touchdown. Failure to keep the aircraft ahead in sight was a cause factor.

that the mishap could have been avoided had an alert tower operator noted the aircraft lights were on DIM and/or the anti-collision light was turned off and had advised the pilot accordingly.

Secondly, there appears to be a problem that arises in split communications and split control. Perhaps a tower air controlman should ask himself what would be the quickest way to contact a GCA aircraft that he saw suddenly entering a dangerous situation. Guard channel? Through the squawk box with the GCA unit? Could he come up on the GCA frequency? This dilemma was present in one accident and a timely warning was not passed quickly enough.

The Pro

What about these axioms of nightmanship? What are they and where did they come from?

They aren't new—we all learned them somewhere along the line. Some may have been overlooked. Others may just need reemphasizing again.

Let's go over those indicated by the accidents studied. Most of them will merely be a review of those that you already know. Never can tell though, there might be a new one that you can add to your own professional knowledge of nightmanship.

• *Lights*—Command your share of visual attention in the pattern. With STEADY/DIM lights or no anticollision light on, your plane is a poor competitor for attention against a lighted background.

• *Cockpit*—Know your cockpit cold. Can you perform cockpit procedures without concentrating *all* your attention on them? Real nightmanship pros are able to manipulate tacan, omni and UHF channels, light settings, gear and flaps without looking. They are then free to concentrate on flying the bird, watch for other traffic or monitor instruments a little more closely if there's a "black hole" off the takeoff

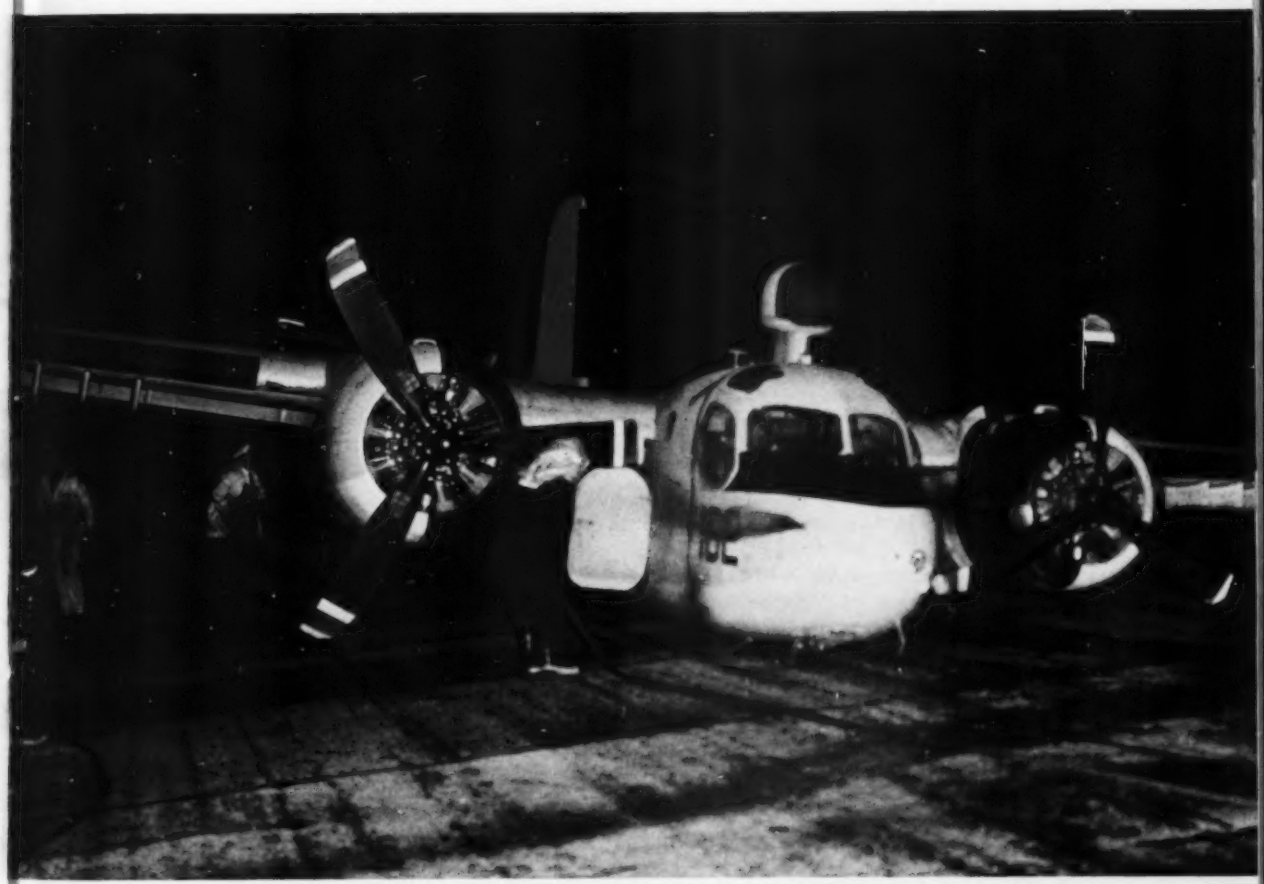
end of the runway.

• *Haste*—At night it can be deadly—especially on takeoff during the climb transition period or gear and flap retraction (getting the wing down in the case of F-8s). If a controller errs in clearing you to enroute frequency immediately after takeoff, *this doesn't mean that you must switch at that time.* Also, if answering an air controller expeditiously is going to rush you at any critical time, the old pros say, "Fly the airplane first—answer the controller when the time is more opportune. He'll wait a minute."

• *Night Break*—The general prudential rule is that the night-break interval should be double the day-break interval. This not only gives a greater landing interval but provides for extra separation to cover deviations of others in the pattern.

• *Landing Interval*—Keep the plane ahead in sight. Although this is often extremely difficult, it is a prerequisite in maintaining a safe night-landing interval. If uncertain as to your interval on the plane ahead, don't allow yourself to become so engrossed in finding him that you forget your own landing check list. If you lose sight of the airplane ahead, don't be embarrassed to come up on the radio and inquire.

• *Landing Rollout*—When landing with a "reduced" interval, hard braking reduces the interval for the aircraft behind. Don't be in a hurry to slow down for an early turnoff. *Jets should plan on taking it to the end of the runway for final night landings unless SPECIFICALLY cleared earlier by the tower.*



Pilot and copilot distraction in establishing interval within normal VFR, GCA and FCLP patterns was a factor in this wheels-up landing.

Ever Been Flight Violated?

What types of flight violations are filed against military pilots by FAA? If you don't know read 12 months worth of them and calculate how you can avoid doing any of these things.

The three most common types of violations concerned Careless or Reckless Operation, Deviation from a Flight Plan, and Failure to Comply with ARTCC Instructions. A review of all violations indicates that the two significant factors responsible for violations are, "lack of knowledge" and the "misunderstanding of FAA instructions."

- Entered Positive Control Area without authority. Oversight in flight planning.
- Deviated from flight level without traffic control approval.
- Changed altitude on IFR flight plan. Descended from FL 290 to FL 200 without amended clearance. Assumed GCI control had obtained approval for altitude change.
- Erroneously assumed GCI controller would advise FAA of altitude change.
- Inadvertently exceeded assigned flight level. Reported at FL 270 when assigned FL 250. Communication difficulties were distracting factor.
- Climbed from FL 350 to FL 470 without ATC approval. Had communication difficulties, but did not follow required procedures for such emergency.
- Flew above altitude specified in clearance. Misinterpreted instructions.
- Made approach at airport other than destination through error in navigation. VOR tuned to wrong station.
- Exceeded clearance limit without obtaining amended clearance. Flew past intersection.
- Climbed aircraft without clearance while on IFR in controlled airspace.
- Performed acrobatics on the airways during an airshow. This involved lack of adequate instructions concerning air show maneuvers.
- Exceeded clearance altitude limit of SID. Climbed to 8000 feet when the crossing altitude of fix was 5000 feet.
- Took off without tower clearance. Misunderstood instructions.
- Failed to adhere to SID departure procedure. Misunderstood clearance instructions.
- Operated VFR in Positive Control Area without prior ATC clearance.
- Departed assigned altitude without air traffic approval.
- Deviated from assigned altitude. Climbed from FL 290 to FL 310.
- Took off without clearance from tower. Pilot assumed he had takeoff instructions.
- Operated aircraft too close to other aircraft.
- Took off without tower clearance. Misinterpreted instructions for other aircraft.
- Did not adhere to SID departure altitude limits. Misinterpreted clearance instructions.
- Transponder not operating in Positive Control Area.
- Pilot followed his mission requirement. Climbed into Positive Control Area without traffic control approval.
- Operated in controlled airspace without transponder. Changed altitude without approval.
- Pilot followed original flight planned route which had been altered in clearance instructions.
- Descended from FL 250 to FL 240 without ATC approval. Had communication difficulties, but did not follow lost communication procedures.
- Pilot assumed he had IFR clearance approval and entered airspace Positive Control Area on VFR. Radio difficulty precluded contact with traffic control.
- SID altitude restriction not adhered to due to oversight or lack of attention during climb.
- Passed through SID altitude restriction without clearance.
- Flew in Positive Control Area without clearance. Failed to note area during flight planning.
- Exceeded altitude restriction cited in clearance before passing fix. Fuel siphoning was a distracting influence.
- Operated aircraft at less than 500 feet above the ground. Struck radio tower.
- Performed acrobatics on takeoff in air traffic zone.

But be not dismayed by this list. Each year has shown a decline in the number of violations. In most cases, where a minor misunderstanding occurs, violations are not filed by the FAA. In these cases, a telephone discussion with the pilot at his destination presents a very simple solution.

MISSED APPROACH

TRUTH and CONSEQUENCES

Upon seeing the column, the copilot grabbed the yoke and pulled up and to the right

Patrol flight crews are among many units in today's Navy that are frequently called upon to put in exceptionally long working days.

An eight- to ten-hour patrol usually requires one to two hours of briefing and preflight before takeoff and the same amount of time for postflight and debriefing after landing.

Any way you cut it, a very long working day, approaching 15 hours, is the result.

Strange as it may seem, patrol crews occasionally become involved in marathons of 24 hours or more, usually spending the last 10 or 12 hours of this period in flight!

Situations like this may develop somewhat as follows:

A crew reports to the squadron area at 0800 to begin preparations for assuming the Ready Alert at 1000. After checking out the aircraft and getting an OpCon briefing, everything is set. Now it's just a question of waiting out the 24-hour watch.

During normal working hours, the crew will probably remain in the squadron area, working at their regular ground jobs. However, they may secure to on-station quarters earlier than usual . . . say around 1500.

A few may be able to take naps at this time of day, but most of the crew, not being tired or sleepy, will probably sit around playing cards, reading or watching TV. The evening meal consumes an hour or so and then it's back to more of the same . . .

unless there is a good flick at the station theater. By 2100, it's time to start thinking about hitting the sack. . . and then it happens.

The plane commander receives a call to launch the Ready Alert!

A short time later the P-3 is airborne, enroute to the contact area. Around midnight it arrives on station. Now the crew is starting its work day in earnest . . . about 16 hours after coming on duty.

Three hours later, a message arrives requesting that the P-3 remain on station as long as possible. Upon receiving this, the pilot sets up two-engine operation, computes his off-station time, and transmits it to OpCon.

After what seems like an eternity, the black horizon begins to lighten faintly in the east as dawn approaches. A short time later, the first rays of sunlight begin beaming into the cockpit, further irritating eyes that are already red and burning from the effects of fatigue and staring for hours on end at lighted instrument panels.

The arrival of dawn brings with it an almost irresistible longing for sleep . . . regardless of the circumstances.

Off-station time finally arrives and the P-3 begins climbing out for the trip home.

The weather forecast for ETA looks good . . . "Improving rapidly, forecast high scattered by 0900, visibility 10 miles." At least they can look forward to a no-sweat approach and landing.

Shortly after arriving over home base, the plane commander receives a special weather observation. The station is still blanketed by fog with visibility at ½ mile. Precision approach minimums for the landing runway are 100 feet and ¼ mile.

Then GCA establishes radar contact and the approach begins. The pilot and copilot have been awake now for about 27 hours and in the air for almost half this period. The stage is set . . . for most anything.

For a closer look at what transpired in the next few minutes, let's examine the pilot's statement.

"The radar altimeter was set at 100 feet.

"After several vectors by GCA I commenced the final approach five miles out from the runway. During the approach everything was normal. My speed throughout was 130-140 knots.

"On final, GCA said 'Take a waveoff.'

"At this time I leveled the wings and added power, then called for Max Power. With Max Power on I felt the port side of the aircraft hit something and felt a port yaw and vibration.

"I looked out the window and noted the No. 1 engine vibrating and called, 'Feather No. 1!' The flight engineer quickly feathered this engine with the emergency handle. I observed the pressure altitude to be 200 feet at this time and the aircraft was climbing.

"During the entire approach I did not see the field or the obstruction I hit. I was on instruments throughout.

"I raised the gear just before we broke out on top of the 600-foot cloud layer. The No. 1 engine was fully feathered and the vibration had ceased. We left the flaps at the takeoff and approach position, where they had been throughout the approach."

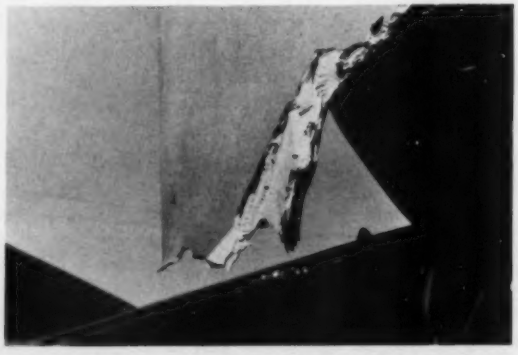
The copilot was looking outside, trying to spot the runway as the aircraft approached minimums. Here is his account of those few seconds just before and after the aircraft struck the fog-shrouded object.

"As we approached ceiling minimums, we were slightly above glide path. The pilot pulled off power to drop back to the glide path. We set up a fairly good sink rate . . . in the neighborhood of 12-1500 feet per minute.

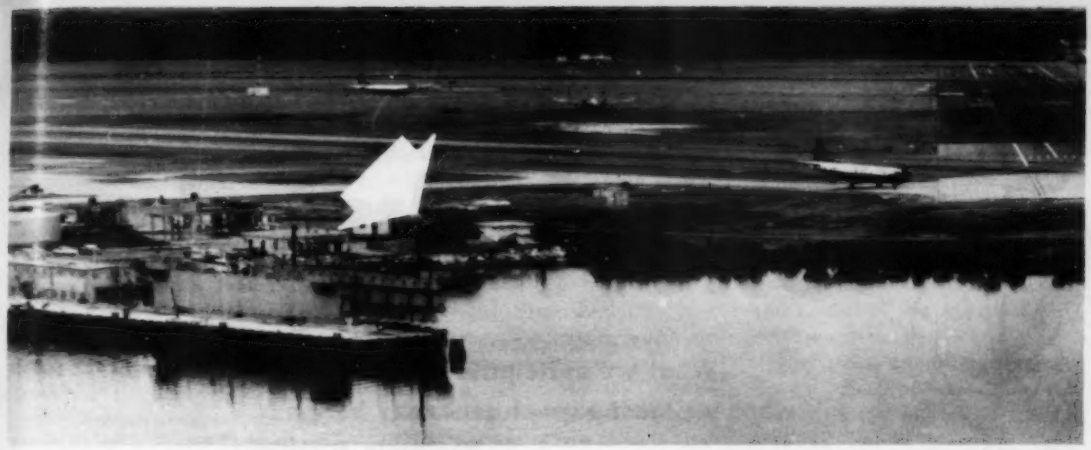
"As we approached minimums, I called, 'Minimums.' Noticing the red warning light on my radar altimeter come on at practically the same instant, I said 'Minimums' twice more.

"At this time, GCA called 'Take a waveoff, centerline too far right.'

"I was now looking into the fog, attempting to see the field. I saw two vertical columns in the fog at about this time. It was apparent that we were going to strike these columns and I grabbed the yoke with both hands and pulled up and to the right. The port side of the aircraft struck these columns and a violent vibration immediately ensued. I saw that the aircraft, nevertheless, was climbing and airspeed was normal. To the best of my recollection



Pieces of the shattered No. 1 prop flew like shrapnel into parts of the wing and engine cowling.



The 43-foot I-beam extended 16.6 feet into the 50/1 approach slope

the pilot had initiated waveoff power just before we hit the columns."

On the way to an alternate field, the pilot tested the aircraft at various speeds and configurations. The remainder of the flight was routine.

Examination of the GCA tape at home base revealed that the P-3 was on course and on glide path at one mile from touchdown. About 10 seconds later, GCA reported "Going above, now slightly above, rising".

The pilot responded by reducing power, but the resulting sink rate then became excessive . . . about 12-1500 feet per minute.

Four seconds later GCA waved off the aircraft because it was drifting too far left of the centerline.

Simultaneous with the instruction to waveoff, the low level warning light (set for 100 feet) on the copilot's radar altimeter came ON. His pressure altimeter also indicated 100 feet at that time.

Response to the waveoff instruction was reasonably prompt. Power was applied to level off and then climb out in accordance with missed approach procedure.

Initial power was 1400 hp according to the flight engineer. Had the rate of descent been close to 500 feet per minute at the time, this power application would probably have been sufficient for level-off, but the P-3 was descending at at least twice this rate under instrument conditions with a fatigued pilot at the controls.

Some two to four seconds after the initial power application, the pilot called for max power and began a pull-up.

Impact with the I-beam an instant later provided an uncontestable indication that the aircraft was indeed well below the glide path.

A second or two after impact GCA called "Pull up, climb straight ahead to 1500 feet!"

During the investigation, it was determined that the 43-foot I-beam struck by the P-3 was attached to a floating drydock that was temporarily moored at a pier on the perimeter of the air station. The exact position of the beam was 1070 feet from the approach end of the runway and 1570 feet from the normal touchdown point. This location put it within 40 feet of the ¼ mile visibility minimum and 380 feet to the left of the extended approach centerline. It penetrated 16.6 feet into the 50/1 approach slope.

The board felt that the pilot erred in not initially applying sufficient power to immediately establish a positive rate of climb when waving off. "An aircraft cannot descend on the glide slope to minimum altitude," it commented, "and then level off immediately, without going below due to the inertia of the mass." As a supplement to the normal GCA transmission "Approaching minimums," the board recommended a procedure for NATOPS whereby the copilot would call out "Approaching minimums" or "100 above minimums" during the approach.

The following strong contributing factors were present in this incident, according to the board:

- Fatigue and impaired judgment caused by lack of sleep.
- The location in the approach zone to the runway of an unauthorized obstruction.

A program of continuing review of instrument approach zones was recommended "to insure that . . . . . objects do not conflict with the Criteria for a Standard Instrument Approach."

Perhaps the GCA outside observer's remark provides the most fitting conclusion to this story. Upon seeing the P-3 sweep low over the floating drydock and then merge back into the fog, he exclaimed excitedly to the men in the GCA trailer, "Holy mackerel, fellers, that was close!"

Short Snorts

What we anticipate seldom occurs:
what we least expect generally happens.
Benjamin Disraeli

An Exception

Immediately after power was reduced from normal rated, the starboard engine of the *Neptune* began running rough. The aircraft was on the downwind leg at 1000 feet. It had just taken off with the intention of coming back around for another full stop landing.

Erratic indications on the starboard fuel flow and torque oil pressure gages accompanied the abnormal engine operation. The engine analyzer showed loss of power in the No. 11 cylinder of the starboard engine.

After reviewing the situation, the instructor pilot elected to make a preventive feathering of the starboard engine. He then landed successfully using jets to back up the remaining recip.

A cylinder and Power Recovery Turbine change put the engine back in good running condition. The evidence indicated that prompt feathering probably prevented complete engine ruination.

At first glance, this success story may appear to run contrary to the often expressed admonition that a malfunctioning engine should never be feathered as long as it is putting out usable power (positive thrust), but before coming to that conclusion, let's take a closer look at the facts.

In this case, the circumstances were exceptionally favorable. The P-2 was light, its jets were running and it was in the landing pattern when the malfunction occurred. There seems to be little if any basis for criticizing the plane commander's decision to feather immediately in this *particular situation*, especially since his three remaining engines were more than capable of providing sufficient power to allow for a safe landing.

It might be appropriate to point out now that had a twin-engine aircraft been involved in this particular incident, the pilot's response might well have been quite different. As indicated in the January 1965 APPROACH article, "Engine Out," a pilot's reluctance to feather a sick engine (but still providing usable power) will increase in inverse proportion to the number of engines he has remaining. Therefore, a *Stoof* pilot faced with these particular circumstances might have elected with good reason to nurse an ailing engine along at reduced power until a safe landing could be made (*See page 13 for an S-2 immediate feathering incident*).

The long-standing recommendation that a malfunctioning engine should be nursed along while it continues to produce usable power is intended as a generalization (and a good one at that). It should not be taken as virtual rule, applicable in every situation.

It might be well to keep in mind that many of the rules we are taught may have exceptions under particular circumstances. Therefore, it is not enough to fly by cookbook techniques alone.

In the final analysis, it is the judgment of the individual, taking all available advice into consideration, which must prevail.

Weekly Pilots Aircraft Inspection. Why?

The weekly pilots aircraft inspection has been a constant source of irritation to pilots in this squadron. This program must continue if for no other reason that we are instructed to do this by BuWeps, ComNavAirPac, RCVW. Quality Control does, however, benefit from the conscientious execution of our inspection forms. An average of 40 work orders are written weekly on the discrepancies recorded on the sheets.

In addition, these sheets provide us with a control document to

evaluate the daily inspections performed by the line divisions. The squadron's corrosion control program benefits from these inspections also. Most daily inspections are completed by the second and third shifts under poor light conditions and with the influx of fleet aircraft into the squadron, it is recognized that more emphasis must be placed on corrosion control.

For these reasons, the weekly inspection is a must. Even though it is hard work, it helps keep the birds up.

—From a Squadron Newsletter

Double Trouble

Here's one for the high performance types who may scoff at the perils of thunder and lightning.

Take four F-4s winding up a cross-country, put them at 34,000 feet in thin cirrus clouds in normal close formation, then toss in some local storm cells.

Airborne radar was helping the lads stay out of the thunderbumpers, but as the flight passed between two storm cells, a lightning bolt passed horizontally through the formation under the leader's aircraft and in front of No. 2 and No. 3 aircraft. Almost immediately both No. 2 and No. 3 fell back out of the formation. No. 2 was squawking, "Left engine flame out" and No. 3 was complaining that his right engine had flamed out.

As a descending left turn was initiated, the flight leader declared an emergency with a control center and received a vector to an emergency field.

When both ailing *Phantoms* managed airstarts, the emergency was cancelled and the flight continued the hop with no damage to either aircraft.

Postflight questioning of the aircrews disclosed that No. 2's left engine and No. 3's right engine flamed out simultaneously, a split second after the lightning strike. The cause of the flameouts was undetermined, and no discrepancies were found during subsequent ground checks and test flights.

Suspected cause: Lightning bolt may have caused an atmospheric phenomenon that temporarily interrupted airflow to the outside (with respect to the leader's position) engines of the No. 2 and No. 3 aircraft.

Great Water Spray

The pilot and crewmen of the ditched EA-1E retained their hard hats and all had their visors down for the helicopter rescue. As the squadron had learned the previous week (we did not wear hard hats for a practice helicopter rescue), the rotor wash from the SH-3A creates a great water spray that hinders vision. All three survivors felt that keeping the visors down while under the helicopter significantly reduced the effects of the water spray.

—Flight surgeon in MOR

Slow-Speed Flight Characteristics

The movie "Slow Speed Flight Characteristics of Swept Wing Aircraft" is listed in NavWeps 10-1-772 dated 1 August 1963—"Cumulative Supplement to U. S. Navy Film Catalog" under U. S. Navy MN-8617 and should be available in your local areas. Application is not limited to the *Crusader* though the film utilizes the F-8 design. It is considered appropriate for training squadrons' indoctrination of new pilots and a timely refresher for the "old pros."

Hectic Approach

As the landing gear was being lowered upon completion of a local test flight, the S-2 copilot saw a large oil leak in the starboard nacelle.

A quick check of the starboard oil pressure gage revealed a fluctuating oil pressure indication. Upon seeing this, the pilots immediately retracted the landing gear, feathered the starboard prop and continued the approach . . . single-engine style.

The engine secure checklist and landing checklist were completed prior to a landing which was uneventful despite a strong gusty crosswind condition.

The body of the starboard engine vacuum pump had broken open, permitting engine oil to be pumped overboard.

Changes to NATOPS Manuals

An analysis of aircraft mishap reports indicates that confusion exists among operators as to the correct method of submitting requests or recommendations for changes to NATOPS Manuals.

"OpNavInst 3750.6E specifically requires comment, whether or not recommendations for changes to NATOPS have been proposed in cases where an aircraft mishap indicates possible need for such change.

"OpNavInst 3510.9A outlines procedures for submitting these recommendations.

"NASC does not govern, nor does it coordinate changes to a NATOPS Manual. Instead, it monitors proposals and recommendations for safety of flight criteria. NATOPS recommendations included in aircraft accident reports do not constitute a valid request for such changes. *It remains the individual responsibility of the activity submitting the recommendations to initiate separate correspondence in accordance with the provisions of OpNavInst 3510.9A.*"

Increased flight deck safety, better aircraft directional stability and reduced launching intervals are all benefits of

NOSE TOW CATAPULTING

By Donald B. Small
Grumman Aircraft

Adapted with permission from a paper presented in 1964 to the American Institute of Aeronautics and Astronautics.

Since the end of World War II, three major advances have been made in carrier aviation; the steam catapult, the angled deck, and the optical landing systems. Now, through the efforts of the U. S. Naval Aircraft Engineering Laboratory in conjunction with a major aircraft manufacturer, a fourth major development is in the offing—the nose tow catapult.

Feasibility studies conducted in 1956 by the Naval Aircraft Engineering Laboratory using boiler plate dead load and obsolete aircraft demonstrated the dynamic effects of this launching method.

Concurrent with the NAEL tests, the Grumman Aircraft Engineering Corporation, at the request of the Navy Department, was conducting an analytic study to determine if the E-2A (in the design stage at the time) could be equipped with the nose wheel tow. Both organizations concluded that full scale dynamic tests utilizing production prototype hardware were needed in order to substantiate or modify the design theory and analysis; and to ascertain what changes, if any, would be needed to the basic aircraft and deck equipment.

Tests were successful and BuWeps decided to incorporate nose wheel tow in the design specifications for future carrier based aircraft. The requirement for nose wheel tow was incorporated in the detail specifications for both the E-2A *Hawkeye* and the A-6A *Intruder* aircraft.

Let's examine nose wheel tow catapulting and point out some advantages over the current system.

Figure 1 illustrates the new system and its major components:

- The tow link, a short stiff bar which replaces the long flexible bridle or pendant as the towing member
- The drag brace which transmits the towing load to the aircraft's fuselage
- The catapult shuttle modified for nose tow
- The trail bar, a fixed link which is attached

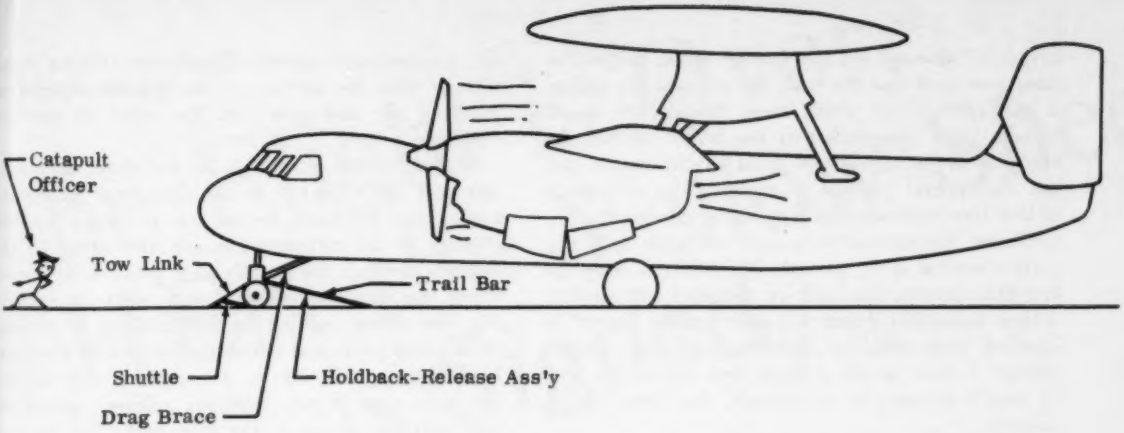
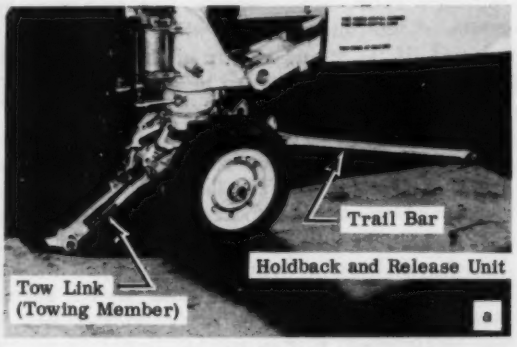


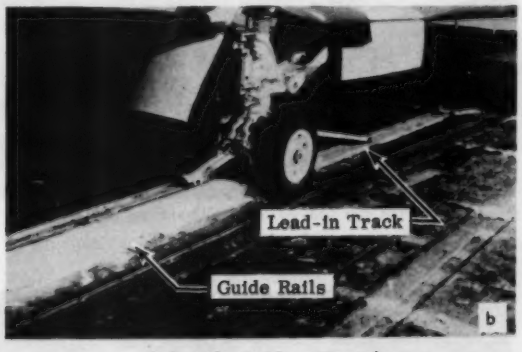
Figure 1

to the nose gear by the release element and replaces the holdback and release assembly.

The nose wheel tow system may be initiated at any point on the flight deck where the flight deck personnel can attach the trail bar to the aircraft. The aircraft then taxies forward to a position where the tow link mechanism is lowered into position. Once the tow link is lowered to the deck, the aircraft is taxied forward where the tow link engages the catapult lead-in track. As the aircraft continues forward, the



Ready to taxi



Automatic steering engaged

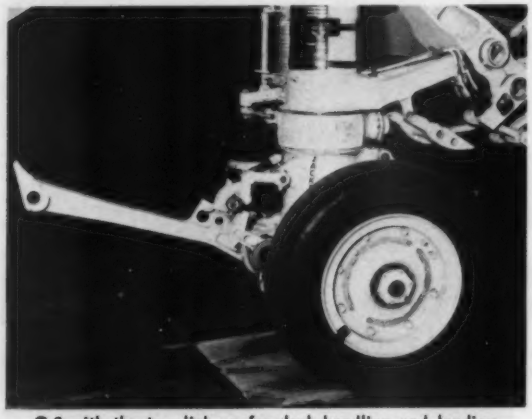
Approach to catapult shuttle

Tensioned—ready for launch

tow link, directed by the lead-in track, aligns the nose gear such that the trail bar engages the buffer, a hydraulic device which stops the aircraft in 18 inches. Upon completion of the buffer stroke, the tow link drops in place in front of the shuttle and the 3500-pound preload is applied. The aircraft is at this time tensioned up and ready to launch.

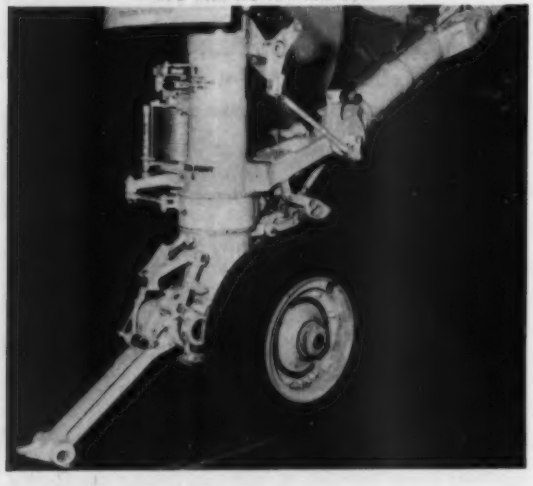
During the normal prelaunch evolution only one man is needed at the aircraft. His job is to drop the tow link, monitor the hook-up sequence and conduct a final inspection. From that point on the aircraft is handled from afar by directors and the catapult officer. A basic lesson in flight deck safety: the fewer people exposed to an aircraft, the fewer people injured.

The mechanics of the launch are the same as in the conventional system. The power stroke commences with the parting of the release element in the trail bar and ends with the relief of the tow link load.



C-2 with the tow link up for deck handling and landing

A-6 with the tow link down



Because of the attachment of the short, stiff tow-link and the trail bar to the nose gear mass, the towing and holdback forces are no longer applied directly to the airframe but are introduced to the fuselage through the flexible nose gear. With a nose wheel tow airplane tensioned and ready for launching, the thrust applied by the engines is resisted at the nose gear, and not at the aft end of the fuselage, thereby introducing a compressive load into the nose gear. Upon holdback release, immediate load reversal occurs in the nose gear; for the catapulting tow load is now transmitted to the fuselage by the tow link/nose gear combination.

At the end of the power stroke, as the aircraft leaves the deck, the tow link is simply rotated up to the landing position with no damage to the aircraft. On both the E-2A and the A-6A, it requires a double failure of the retraction mechanism to have a DOWN link after catapult launch and gear retraction. In the case of both the A-6A and E-2A, the retraction spring will return the link to battery by means of the linkage system when the tow link is released. If the spring or any of the links do fail, the tow link will be returned to UP and LATCHED by camming action during gear retraction.

With nose tow there is no need to wait until the airplane is climbing away from the ship to call the launching successful. Since there is no bridle slap or tremendous tire-blowing main gear loads associated with the conventional bridle catapulting, a launch can be considered successful upon the attainment of flying speed. As soon as the shuttle returns and the catapult is ready, another aircraft can be launched.

The first squadrons of the nose wheel tow equipped A-6A *Intruder* and E-2A *Hawkeye* aircraft are now in the fleet. It is expected that as fleet personnel become familiar with nose wheel tow, the cycle time for launching a carrier based striking force will decrease and will continue to do so until the optimum time is reached.

A look into the future of Nose Wheel Tow Catapulting at this time shows the gradual phasing out of the cumbersome and costly bridles and pendants as aircraft using the conventional system are replaced, for the Navy Department is now incorporating the requirements for nose wheel tow into the specifications of the next generation of carrier-based aircraft.

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By LT T. L. Nelson
ASO, VA-115

The Flight is Over ... WHEN the Yellow Sheet is Signed

It was good night flying weather and the brief had gone as scheduled. A little extra time and precaution had been taken as the holiday season had just ended and the squadron had not done any night flying for three weeks.

The entire flight went well and each aircraft, in turn, made a GCA to final landing. As the number four aircraft touched down and started its rollout the pilot saw he could make the short turnoff and started braking.

As he approached the turnoff he tapped his left brake and added left rudder to start the turn.

No sweat at all. Now, to turn off the unnecessary electrical gear and save that old battery while at idle RPM. As he looked down to turn off his tacan the aircraft came to a rather rapid stop. The pilot looked out of the cockpit and saw not one, as expected, but two rows of taxiway lights off his starboard wing. A closer look indicated, much to his embarrassment, that the *Skyraider* had come to a stop in the grass about ten feet off the port side of the runway—short of the taxiway.

Fortunately, the pilot looked before adding power. Had he attempted to get back on the taxiway with throttle he might have nosed over in the soft ground. The aircraft was shut down, pulled back onto the runway and towed to the hangar.

On this occasion, thankfully, there was no damage other than a set of extremely muddy tires and wheels. It took about one man-hour to hose them off and check the rest of the plane for damage. The only pilot injury sustained was that of embarrassment at the following morning's All Pilots' Meeting.

The crux of the pilot's embarrassment was a lapse in judgment—haste in cleaning up the cockpit; simultaneously slowing the aircraft, turning off the runway, and sticking his head in the cockpit to secure equipment. In short, he was not prepared to turn off.

Perhaps a little introspection in this area would be beneficial to us all. After touchdown, what is your attitude? Are you still with the aircraft or are you thinking about that hot shower, good meal, or great date waiting for you? Regardless of the aircraft you fly, the flight is not over at touchdown. The aircraft must be slowed to taxi speed, taxied to the ramp area, post flight checked, and the yellow sheet signed off before you change to a non-flying attitude. This demands 100 percent mental awareness until the yellow sheets are signed. Don't be caught short by quitting too soon.

Think on these after you've signed the yellow sheet.

Tired

On an October night during carrier qualifications, a fleet replacement pilot under training was about to make his first night carrier landing attempt in the F-8. He had proceeded without difficulty through the CRAW program and had successfully completed 10 carrier landings during the current cruise. He was considered ready for night landings.

The day before the accident, the pilot had gotten one day trap and had bingoed back to the air station to remain overnight. The next morning he flew back to the ship and successfuly completed six landings before noon. He remained aboard ship, had lunch, relaxed and launched for his second period at 1535. During his second period he made three more landings, giving him 10 day landings preceding night work.

On returning from his second hop, he found he was not on the schedule for that night and was told that he would not be flying any more that day. With that, he assumed the SDO watch about 1615. Except for supper, he stood the watch until about 1845 when he was told that he probably would fly a night period. The idea was to let him have one trap and then bingo back to the beach. Before a definite decision to fly him had been made (while he was under the impression that he was not to fly) he had listened to the pre-night brief in the readyroom since he was already present as SDO.

When he was told definitely that he would fly that night—about 30 minutes before he was to man the plane—he hurriedly got his gear together. In his haste he forgot to load his revolver. In a hot switch he took over an F-8E from another pilot on deck who had already been in the pattern. He strapped in around 1915. After a 15-minute wait, he was launched at 1934. He had felt somewhat fatigued after his second hop that day but had not mentioned it to anyone and did not consider it grounds for refusing the night hop.

Flying the ship's CCA pattern, he made his first two passes low and was waved off both times. Going around the third time, he felt somewhat uncomfortable and adjusted his mask, the intensity of cockpit lights and the temperature control. He then discovered he had descended to 350 feet.

At this point he resolved either to get aboard on that pass or return to the beach, whether or not the ship so directed. His third approach seemed to be going well until in close when he suddenly went low. He selected full military power to recover and inadvertently lit the afterburner. The aft end of the aircraft struck the ramp. The aircraft then became airborne at a 10- to 15-degree climb.

The pilot later described the impact of the ramp strike as being extremely violent. His first impulse was to eject. He paused, however, until the plane would no longer respond to the controls. Then, with the plane in a 10- to 15-degree climb, and 10 to 15 degrees port bank, with no conscious effort he positioned himself in the seat and pulled the face curtain as the edge of the angled deck flashed by.

The ejection occured at an estimated 150 feet and was described as a "smooth acceleration" without perceptable jolt. He remembers a sensation of heat as he left the plane—then tumbling and a glimpse of flame.

The pilot has no specific recollection of seat separation; the parachute opened smoothly without a jar. He saw the aircraft, by then in a starboard bank, crash into the water off the starboard beam of the carrier.

He entered the water at approximately 1952, inflated his Mk-3C and released his upper rocket jet

. . . fatigue was known only to the pilot.

Pilot

fittings. The chute settled quietly in the water. The sea was relatively calm and his immediate concern was to free himself from the shroudlines. (*He was not carrying a shroudcutter as required by the F-8E NATOPS Flight Manual.—Ed.*) Since a few of the shroudlines were draped over the top of his helmet, he removed and discarded it. He does not remember removing the oxygen mask, but thinks he probably did this just before entering the water.

As the carrier slipped on by and out of sight, he felt some apprehension but at the moment was more concerned with freeing himself from the shroudlines. This done, he unfastened the right side of the seat pan and tried in vain to locate the raft lanyard on the left side of the seat pan. (*Correct procedure is to unfasten the left side first. The lanyard is located on the right side. Ideally, this is done during parachute descent instead of in the water but in this case, of course, the pilot did not have time.—Ed.*) The investigating flight surgeon reports that although the pilot had been adequately trained in this procedure, he did not realize his error until the next day when he was describing the entire sequence.

Seeing the silhouette of a destroyer, the pilot ignited one of his night distress signal flares. He then reached for his revolver but remembered he had forgotten to load it. At this point, the flight surgeon says, the pilot "hoped that the last man to use it had forgotten to *unload* it."

As the destroyer plied the area with its searchlights, the pilot turned on his red-lensed right angle flashlight and signaled "OK" in Morse code a number of times. Then he left the light on steady. As the destroyer neared, he ignited a second night distress signal. Shortly thereafter, the destroyer's motor whaleboat came alongside the pilot. After the crew had determined he had sustained no apparent injury, he was hauled aboard. It was 2005.

The investigating flight surgeon concurred with the accident investigation board's decision that the primary cause of this accident was "pilot factor."

"Intimately involved in this is the element of fatigue," the flight surgeon states. "It should be emphasized, however, that the fatigue present was known only to the pilot, himself, since his supervisors saw no evidence of it in his actions or remarks before the hop, since his activities in the 48 hours preceding the accident were not considered to be grossly fatigue-producing in the average individual and, finally, since he did not mention the fact of his fatigue to anyone else.

"Fatigue has always been and will probably always continue to be a factor to be reckoned with any time flight operations are in progress. The acute form, 'skill fatigue' should be watched for—even anticipated—by supervisory personnel, the flight surgeon and the pilots themselves. The elements of fatigue should be made familiar to pilots during the regularly scheduled flight surgeon's lectures and should be re-emphasized during briefs. This program is ordinarily done and is especially important during carrier qualifications when younger, less experienced (and sometimes less cautious) pilots are involved. Although the flight surgeon, supervisory personnel and the pilot are involved in this, in the final analysis, it must be the pilot himself who must be familiar with, recognize, and take appropriate action if fatigue does occur in any given situation, even if it means cancelling a hop. Fatigue is a subjective reaction and the primary responsibility for corrective action lies in the person who experiences it.

"Lack of mental preparedness is another element which has been brought out in this investigation," the flight surgeon continues, "and, although I do not think it played a role in the causation of the accident, I think it is of enough general significance to warrant comment. (Except in an emergency) an effort should be made . . . to allow the pilot sufficient time before a flight to mentally prepare for it, not only in terms of the specific mission with its unique details and possible emergency situations, but in a general sense as well so that there is no feeling of being rushed. This sensation of being rushed may or may not have an effect on the individual in terms of psychological stress, depending on how compulsive a personality is involved. In any event, with special reference to carrier qualifications where younger pilots are often involved, sufficient time should be allowed as practical so that the individual pilot is prepared intellectually and emotionally for the flight."

Coordination?

Exercises sometimes produce more training and experience than you bargained for...

The launch was routine. The jets were launched first then the Able Dogs. I was then catapulted off the port cat and headed for an AEW station. The mission was an hour and a half Airborne Early Warning flight in preparation for an air defense exercise.

Upon returning to attack carrier Alfa for recovery, I was informed that the deck was covered with aircraft ready for the exercise. They told me to divert to ASW carrier Bravo—50 miles east. After receiving a steer, I aimed the *Willy Fudd* back out to sea.

It was getting dark in the Mediterranean; it was now about 1830.

With the help of the radar and the directions we were given, we were soon overhead talking to Bravo's Air Boss in Pri-Fly and asking for landing instructions. They sounded as though they were expecting us but kept insisting that we wouldn't recover until 2100. I was tired and hungry after the late afternoon flight and the rest of the crew felt the same way, so I insisted that we were to recover as soon as possible. Besides, I didn't know anything about the schedule to land at 2100. I guess my persistence paid off; we were soon directed to land after the last S-2F.

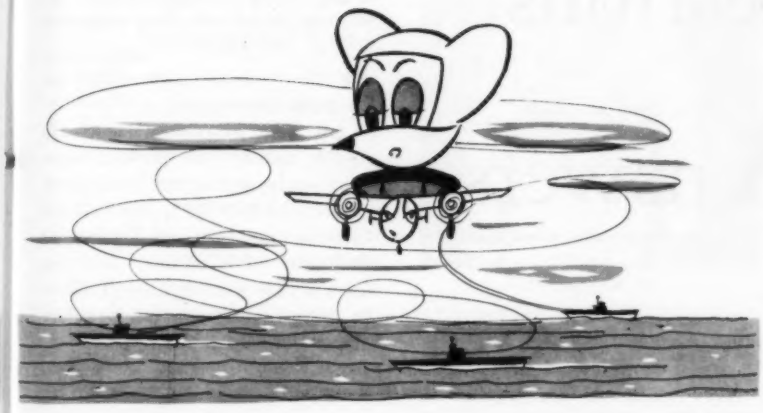
The landing was not too bad, just a little fast. By this time I was used to the slightly wider, slightly longer profile of the attack carrier Alfa on which I had been operating for four months. This smaller carrier was really "dinky."

Being the last aircraft on deck and an unusual one at that, I was completely surrounded by personnel after getting clear of the arresting gear. The operations officer of Bravo was the first one to speak. He wanted an explanation of why I didn't wait until 2100 to land. He even showed me a flight schedule; sure enough a *Willy Fudd* was scheduled to land at 2100. The schedule was that of the attack carrier Delta, however, and I couldn't convince them that I had diverted from the Alfa. Even though they could read the ship's name on the aircraft and I explained the situation, they didn't really believe me. Since I was an unscheduled intruder they decided to send me back where I came from. So, off I went with my

ANYMOUSE

The purpose of Anymouse (anonymous) Reports is to help prevent or overcome dangerous situations. They are submitted by Naval and Marine Corps aviation personnel who have had hazardous or unsafe aviation experiences. As the name indicates these reports need not be signed. Forms for writing Anymouse Reports and mailing envelopes are available in readyrooms and line shacks. All reports are considered for appropriate action.

— REPORT AN INCIDENT, PREVENT AN ACCIDENT —



microphone in my mouth at 2100 (they had hydraulic catapults). I was used to the more pleasing steam cats.

Fifty miles away I sighted the lights of Alfa, explained the situation briefly, and asked for landing instructions.

They were surprised to hear from me, said they couldn't recover us, and sent us back to Bravo again.

Our flight time was piling up since our initial 1700 launch off the Alfa. I had a night landing already, and at 0200 in the morning I got another night landing, again after the last S-2F was recovered.

There wasn't much time for eating or sleeping that night, or rather that morning. They scheduled us to be off the ship at 0500—and off we went. I was more experienced with their hydraulic catapult now, so I didn't eat my microphone.

The visibility was poor; a typical Mediterranean Sea morning—3 miles visibility in haze. After 50 miles or so of water navigation I sighted the shape of a carrier. It was dawn and visibility was bad, but it was an attack carrier and that's all that mattered. We hadn't had any sleep or anything to eat for awhile but we felt better after sighting homeplate.

I switched to tower frequency and told Alfa control that I had them in sight. They called back and said they would take me aboard. They had a recovery in progress. They instructed me to make a normal break and call at the 180.

I flew an unorthodox pattern to the 180 position. Rather than fly alongside, I crossed the bow diagonally. I reported approaching the 180. The ship rogered. They called and asked my position. I told them "at the 90." They again rogered.

As I turned into the groove I was curious about the jets flying past me and I was also curious as to why the ship had moved the mirror. It was on the left side of the landing platform when I left; now it was on the right side. It didn't bother me though. At that moment I was so tired I didn't care which carrier it was. Halfway down the groove my copilot shouted that it was the Delta.

I was talking to the Alfa, called meatball and almost landed on Delta. I waved off to the right between jets and sighted homeplate only about four miles away. We landed aboard shortly after.

We were very fortunate that a lot of circumstances didn't end up in a midair collision or an embarrassing landing aboard the wrong carrier.

Dizziness

I was in an F-9, returning to home base and at FL 310 assigned. About 15 minutes prior to ETA I began to feel nauseous. This feeling increased and was soon accompanied by dizziness.

(Anymouse checked equipment and found nothing out of order and tried the remedy for hyperventilation with no improvement.)

My instrument scan deteriorated and tracking became erratic. Suddenly I realized I was at 20,000 feet! At this point I called Center and requested immediate descent to a lower altitude, explaining that I was hypoxic.

The controller obliged with a quick clearance to four grand and after a few minutes the dizziness and nausea left.

Right after my uneventful landing (safety officers like that phrase) I downed that old Bravo and had my oxygen mask checked thoroughly. We could only come up with conjectures on the cause of the hypoxia but the attitude of ATC made me glad to learn that the controllers in center are up on things like this. In fact, the center was even concerned enough to inform me that my speech had improved after a few minutes at 4000 feet.

Reader Questions Headmouse Answers

Have you a question? Send it to Headmouse, U. S. Naval Aviation Safety Center, Norfolk, Virginia 23511. He'll do his best to get you and other readers the answer.

Fiberglas Patches

Dear Headmouse:

I recently stopped to visit a neighborhood parachute loft to have some of my flight gear checked. (I am fussy about such things.) While there, I noted an APH-6 hardhat in which the Sierra fittings had been cut out and the space patched over with fiberglas. When questioned, the riggers stated that the pilot wanted it done so that he could mount the older type oxygen mask fittings.

As a boat enthusiast, I have worked a little with fiberglas and know that you have to know how to work with the stuff or else. Anyway, my question is: Do you think this sort of modification will improve or weaken the APH-6?

WONDERMOUSE

▶ We cannot give you information on the strength of fiberglas. However, this modification should not be made in the first place. Chief BuWeps letter RAAE-23/637:RJW of 21 June 1962 to addressee field offices, subject: Use of Approved and Tested Components in Aeronautical Life Saving/Support Systems, requirements for, states clearly that nonstandard, untested or nonapproved components shall not be substituted in emergency escape, survival and life support systems. The letter states in part: "Aircrew systems components or assemblies which affect flight safety which have not been tested previously and accepted for release by the government, and which are not carried as standard items in the Navy stock inventory, shall be brought to the attention of the Bureau in writing with a statement concerning status of qualification tests being performed and expected date of submission of test reports and supporting technical data. Assemblies and components affecting safety of flight shall not be incorporated in operational aircraft without appropriate tests and acceptance by the government of the test results."

Very resp'y,

Headmouse

Who's Responsible?

Dear Headmouse:

I've been pondering over a problem I've wondered about for some time now. In the event of a fatal aircraft accident, who has to answer to the investigating board on the pilot's flight equipments? I believe the parachute rigger does.

In that case, what should be done if a pilot were to want modifications of his flight gear not called for in any manual? For example: installation of a boom microphone on the APH-5 helmet used in jet operations and jury rigging the Redar 12-1 oxygen mask hose to accommodate the boom mike and putting the soft corrugated type oxygen hose between the oxygen regulator and the A13-A mask.

If the rigger advises the pilot that this is not S.O.P. for this aircraft, the reply is, "I fly this bird and I want it this way." Assuming the squadron exec is aware of this and there is nothing in writing to tell the rigger to do this, who gets the axe from the investigation board if anything happens?

RIGGERMOUSE

▶ The pilot is responsible, *not* the parachute rigger.

Any pilot who has a parachute rigger modify his personal survival equipment so that it does not conform to NATOPS, the BuWeps Clothing and Survival Equipment Bulletins (BACSEBs), and so forth is only hurting himself. Maybe your squadron aviation safety officer can help you with this problem.

Very resp'y,

Headmouse

Vertigo

Dear Headmouse:

I heard a pilot the other day say he could get rid of vertigo by shaking his head. I thought head shaking was about the worst thing you could do—that it makes vertigo worse.

DIZZYMOUSE

▶ We approach this question with a great deal of caution because what works for some persons won't work for others. The most definitive publication we've seen on the subject is a British Air Ministry Flying Personnel Research Committee study, *Modification of Labyrinthine After-Sensations on Shaking the Head*, by A. J. Benson, Institute of Aviation Medicine, Royal Air Force, Farnborough, Hants, England, (September, 1962). The author made a study of this problem area and concluded:

"The answer to the question posed at the beginning of this paper: 'Does shaking the head have any effect on vestibular sen-

sations?' is yes, shaking the head reduces the duration and apparent intensity of the vestibular aftersensations in about 60% of individuals and increases them in some 10% of subjects, whilst in the remainder there is no consistent effect. Though shaking the head is certainly not a panacea for disorientation, there would appear to be no reason why aircrew, who are aware of false vestibular signals and yet have reliable cues that the aircraft is not turning or being subjected to other patterns of angular motion, should not shake their head for a second or so in attempt to attenuate or even extinguish a false and undesirable disorientating sensation. The importance of the aviator being certain that the aircraft is *not* in angular motion before the head is shaken must be emphasized, for, if the head is moved rapidly when there is angular motion of the aircraft, complex and possibly intense stimulation of the semicircular canals can occur because of induced Coriolis forces. Head shaking in these circumstances is more likely to exaggerate rather than ameliorate spatial disorientation."

Very resp'y,

Life Vests Tests

Dear Headmouse:

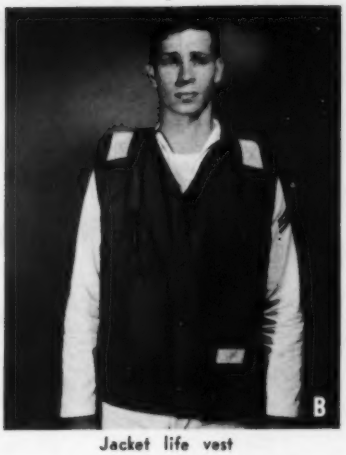
A topic of major concern to a carrier air wing is the outfitting of their flight deck personnel with appropriate flotation gear. During a recent AdMat of a wing at NAS Cecil Field, I inspected the various types of subject gear each squadron had improvised. All the kits were considered adequate, but each had its drawbacks and deficiencies.

I screened previous issues of *Crossfeed* and several survival publications but was unable to find a flotation kit available for issue to shipboard personnel. I feel certain this subject has received maximum attention by ACEL and the NASC, but I am unaware of any evaluation tests or performance data completed to date.

If these tests have been conducted and the information is available for release, please forward same to this command at your convenience.

F. G. HAMRICK
AVIATION SAFETY OFFICER
COMFAIRJAX

Roll-up life vest



Jacket life vest

▶ Evaluation tests of two types of life vests for flight deck crewmen are now being conducted by carriers of the Atlantic and Pacific Fleets. Each fleet is testing 250 vests of each type for a period of 60 days to determine the suitability for tasks which require men to roll, slide on their backs, crawl on their stomachs, or perform other maneuvers peculiar to their duties.

Designs include a roll-up type, photo A, which when inflated is similar to the appearance of the life vest now worn by pilots. The jacket in photo B is made up with a fabric outer cover over an inflatable bladder. The outer shell of the cover is dyed to match color codes of jerseys which now identify various flight deck crewmen.

Each of the vests is equipped with a means for CO_2 and oral inflation. The Survival Branch of the U. S. Naval Applied Science Laboratory is engaged in the development of an automatically actuated CO_2 inflator which will allow operation of the preserver even if a man is unconscious at the time of a mishap.

Additional information will be published as developments occur.

Very resp'y,

Swimming Quals

Dear Headmouse:

In our local regulations there is a requirement for certain swimming tests prior to qualifying an aircrewman. Clarification is requested as to whether this is required Navy-wide, and to what specific minimums?

TREAD WATER, LANDSMAN 1ST

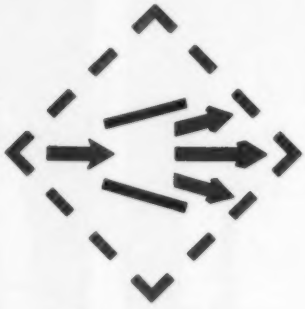
▶ NASC conducted a review of current OpNav Instrs. which indicates that specific swimming requirements are not specified in detail. We'll submit a recommendation to CNO that such requirements be standardized via OpNav Instructions.

Very resp'y,

Headmouse

Hazard

Explosive Actuated Devices



Airborne Auxiliary Turbine Power Plant Inlet/Exhaust

Aircraft M

Servicing & Prec

A long history of accidents and near accidents wrong fuels, oils, other fluids, etc. cal for a servicing. To help reduce the chances wro been developed for the U. S. services Amer NATO nations. Here are the markings as lined

Filin

Fueling
NATO Code No. F.40 Landbase
F 44 Carrier

Rocket Fuels
NATO Code No. ____

Rocket Oxidizers
NATO Code No. ____

Engine
Lubricating Oil
NATO Code No. O-148

Pneumatic
Starter Connection

Hydraulic Fluid
NATO Code No. H-515

De-icing Fluid
NATO Code No. S-742

Coolant
NATO Code No. ____
Water ____ %
Soluble Oil ____ %

Pneumatic System
Max psi ____
Max Kg/Cm²

APPROAC POST-

ft Markings

ng & Precautioning

ar accidents resulting from servicing aircraft with
c. call for a better all-around knowledge of proper
nces of wrong servicing, standard markings have
vices American-British-Canadian nations and the
gs as defined by Military Standard 33739 (ASG).

Ground Handling

Jacking Point

Sling or Hoist Point

Mooring or Picketing

Towing (optional)

Filling

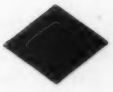
Refrigerant Replenishment

Oxygen (breathing)
Gaseous _____ psi. _____ Kg/Cm²
Liquid _____ Litres

Antidetonant or
Thrust Augmentation
NATO Code No. _____

Air Conditioning

Nitrogen Services
_____ psi. _____ Kg/Cm²



Fire Extinguishing
System
NATO Code No. _____

External Electrical
Connections
Servicing, Starting
_____ Volts. _____ Cycles

Grounding or Earthing
Receptacle
Ground Here

Inspection of Battery

SPECIAL DELIVERY

A pilot with an injured arm and an uninflated life preserver plus a helicopter unequipped to perform the water rescue add up to a difficult experience. . . .

Halfway down the catapult track, the A-4E quit accelerating. Although the aircraft rotated to a normal nose-up attitude as it left the bow, it began to descend alarmingly fast.

Sensing he had insufficient flying speed, the pilot reached for the emergency bomb release handle to jettison stores. Then, realizing how close he was to the water, he pulled the secondary ejection handle.

The canopy was blown to the right and at an estimated altitude of 15 feet the pilot-seat combination arced upward to the left, rising some 200 feet above sea level. The aircraft hit the water in a slight, nose-down, right-wing-down attitude. The pilot did not separate from the seat until just before water entry. One witness said the pilot was about 10 feet above the water at the time.

"I remember seeing the aircraft hit the water," the pilot recalls, "Then I became aware that I was still in the seat and had to make a conscious effort to free myself by attempting to push away. I separated from the seat and very shortly thereafter I hit the water extremely hard."

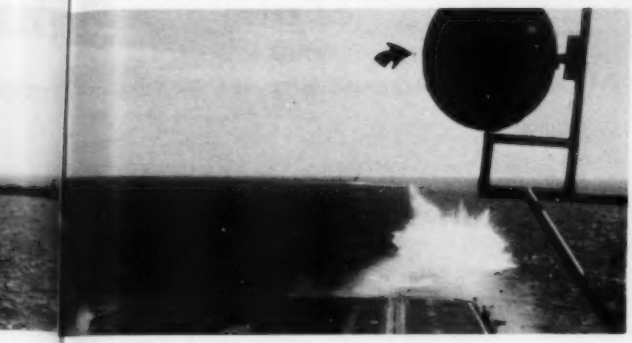
The pilot's parachute did not deploy before impact but apparently was just beginning to stream when he hit the water. The pilot struck the water on his back in a sitting position. He distinctly remembers taking "at least a couple of breaths" under water before surfacing.

As he passed down the starboard side of the carrier, he tried to inflate his Mk-3C life preserver but was unsuccessful. Inspection later showed the right toggle had been pulled but the CO_2 cartridge was not punctured. The safety thread (nylon A) on the left toggle was not broken. At the time, the pilot had been under the impression that he had partially inflated his life preserver.

Because of extreme pain, the pilot had no use of his left arm. The glove on his right hand had bunched around his fingers during ejection and now hindered his efforts to loosen his oxygen mask. He had lost his left glove during egress. Finally, he managed to loosen the right side of the mask.

With the use of only one arm and no help from his Mk-3C, he had an understandably difficult time trying to stay afloat but his troubles were by no means over. Rescue was to prove as difficult as ejection.

A helicopter from another ship was in the carrier's "dog" pattern on the starboard beam waiting to go aboard to deliver mail. This helo happened to be in the closest position for a rescue attempt as ejection took place. The helo crew sighted the pilot immediately following his entry into the water, moved into position and lowered a sling. Because its primary mission was personnel and cargo transport, the helo was not equipped with a rescue seat. Its crewman was not fully qualified and was not equipped to go into the water to assist the survivor. *The*



Far left—Off the bow, insufficient flying speed!
Middle left—Ejection!
Middle right—Pilot and seat (see arrow)
Far right—The pilot was delivered to the flight deck hanging in the sling with parachute still attached.

mail helo did not give way to the carrier's SAR helo although requested to do so.

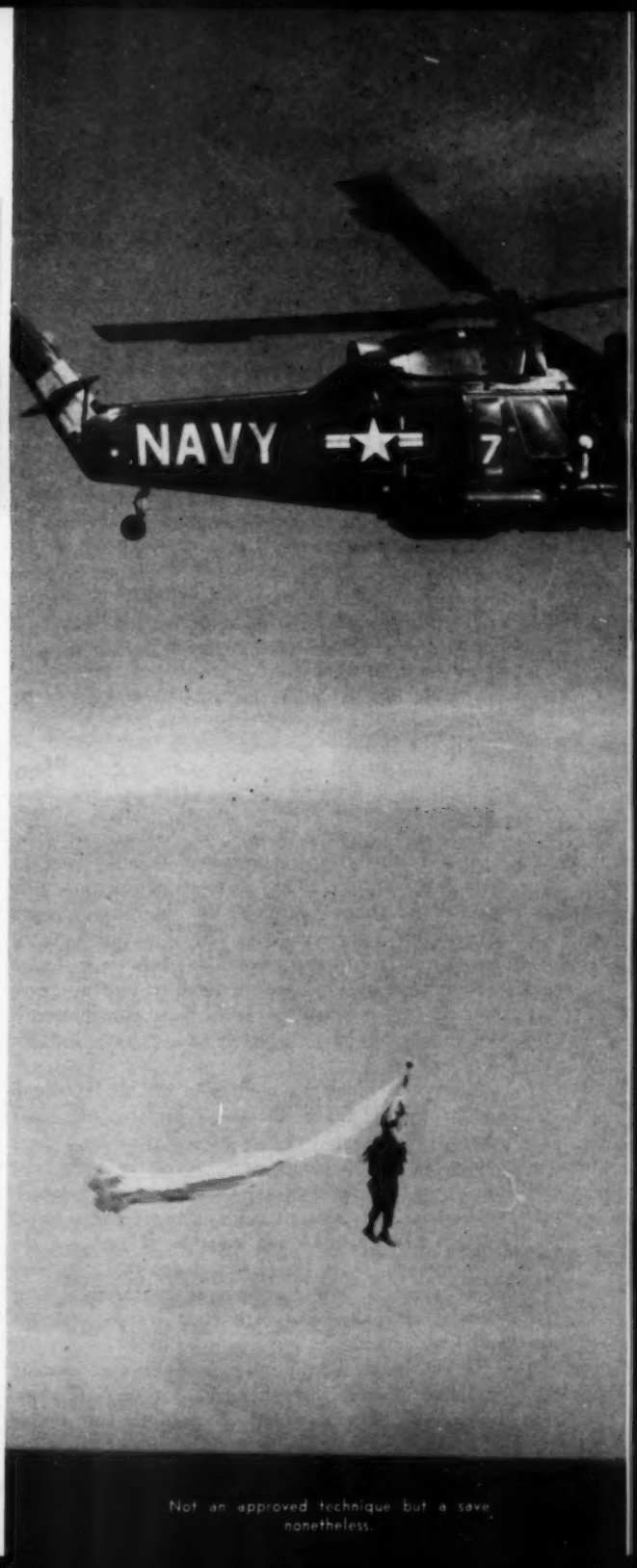
Because of his injuries the pilot had been unable to disconnect his parachute rocket jet fittings. With great difficulty he now managed to get his useless left arm into the helicopter sling but before he could fully enter the sling, he was lifted out of the water.

Realizing his predicament, the injured pilot grabbed the sling with his right hand to keep from falling out. According to the carrier's air officer, at this time the helo was about a half-mile astern. The pilot was delivered to the carrier flight deck, *still hanging in the sling and with his parachute still attached and partially deployed.*

"Fortunately, the parachute did not drag in the water and did not blossom in the air although streaming behind the pilot," the investigating flight surgeon reports. "Fortunately, also, the pilot somehow managed to retain his grip until he was let down, quite gently, onto our flight deck."

The pilot collapsed and was carried to sick bay on a stretcher. He received no additional injuries during the rescue phase.

At the time of the accident, the carrier's helicopter was in the general area. As the survivor passed down the starboard side of the ship, PriFly advised the carrier helicopter crew that he appeared unconscious in the water and that the helicopter crewman might have to enter the water to assist him. The mail helicopter from the other ship proceeded to the rescue. Its pilot saw the survivor thrashing about in the



Not an approved technique but a save nonetheless.

water attempting to keep afloat as he lowered the rescue sling and positioned himself for the pickup.

The AAR has a number of things to say about this situation.

"The pilot of the (other ship's) helicopter was understandably eager to be of assistance, but in his haste to effect the rescue, he violated several basic principles which unnecessarily jeopardized the life of the downed pilot and the safety of his own helicopter crew. Essentially these were:

- "He was not familiar with the superstructure hazards of (the carrier) and almost ran into the aft folding antenna.
- "The crewman was not considered fully qualified and was not equipped to enter the water to assist the downed pilot. The necessity for a rescue crewman in the water was transmitted by PriFly on land/launch frequency.
- "A forked rescue seat was not carried because the primary mission of this helicopter is personnel/cargo transport. The pilot did not give way to a fully equipped rescue helicopter even though requested to do so.
- "The downed pilot was obviously injured, yet the sling was raised before he could position himself completely in it.
- "The pilot was raised out of the water with the parachute still attached and partially deployed in spite of the well-publicized dangers of the drag of a parachute in the water and the possibility of the down wash inflating the parachute while airborne."

Among the AAR's recommendations was that "to reduce the confusion associated with aircraft emergencies and rescue operations, the SAR commander must have control of all units involved. Transient helicopters should be required to report their rescue capabilities when checking in with a control agency. The controlling agency must inform the helicopter of other rescue units in the area and the degree of assistance which may be required in the event of an emergency. This is particularly important during carrier land/launch operations where immediate response is necessary."

As a result of this accident, when this particular carrier's helo is on rescue station, other helos in the delta pattern are directed to remain clear of rescue operations, unless otherwise directed. (NWIP 41-6, is the "Bible" for rescue methods.)

Plan Ahead

There are many types of survival, but . . . specifically, the type of survival that we are interested in in this article is coming back alive after an aircraft mishap. There are all kinds of situations that you can get yourself in along this line, from a weak cat shot off a carrier in the "Med" to getting shot down over North Viet Nam. No training program is going to be able to simulate the exact circumstances of each, *but* by learning certain basic fundamentals you can better adapt yourself to survive a specific situation.

Many individuals are content to just sit fat, dumb and happy and ignore the possibility that they may someday find themselves in a survival situation. Others pacify what little conscience they have with bare minimum training. Just as every bit of extra knowledge about your aircraft tends to make you a better pilot, better qualified and capable of carrying out your mission, every bit of knowledge that you have about survival will correspondingly increase your chances of coming out of a tight scrape with life and limb intact.

If you want bare minimum chances of coming out alive from an aircraft mishap or survival situation, then that's the kind of training you should shoot for. On the other hand if you care as much about statistics as you do your own hide, then a realistic, conscientious training program is what you are after.

Those of you who have had the experience of a good survival course, where you were forced to live off the land for 5 or 6 days, will have to admit that, miserable as it was, a lot was learned that you probably couldn't have picked up any other way except by experiencing it. Of course many of you may not even now realize how valuable the experience was. It may take the real thing some day to drive it home.

No one is advocating that you orient your entire life around the chance that you may someday find yourself alone in the wilderness, or strapped to an ejection seat upside down in the water . . . you should not live in mortal fear of coming down in enemy territory . . . BUT don't ignore the possibility these these things can and do happen! As an aviator and fighting man you may be required to take chances and perhaps risk your neck now and then. However, there is no sense in jeopardizing your life or limb unnecessarily.

—Adapted from 2d MAW Hot Dope Sheet

Ejection!

During a transatlantic flight an A-4C's fuel gage suddenly dropped to 100 lbs. Accompanied by his flight leader, the pilot headed for the emergency tanker. Visual contact was made and the A-4 started moving in for refueling. At this time, the fuel gage had been indicating zero for about three minutes. When the plane was only yards short of plug in, the engine rumbled several times then flamed out.

Here is the pilot's ejection, survival and rescue narrative:

"I had spotted a ship under us just prior to join up on the tanker, I made an immediate left turn to intercept it and pulled the emergency generator out. My radio came back and I called flight leader that I would eject at 10,000 feet. (Actually, the ejection was at 11,500.)

"I switched to manual fuel, airstart on, and allowed the engine to clear. I had set up a 190-knot glide and brought the throttle around the horn to attempt an airstart although I suspected this was futile. I took off my knee board and put it on the panel. Checked my fittings to be sure I was strapped in (had already lowered the seat). Got into a position with feet on rudders, head back and arched, and pulled the face curtain. The canopy ejected and so did I." (*The toe of his right shoe struck the canopy edge cutting the leather and creasing the steel toe cap. His foot was uninjured.—Ed.*) "I started to tumble and threw my arms out to stabilize. When the chute opened, I was on my back, feet high. The jerk was very hard and I believe this is where I got the cut and burn on my neck from the parachute riser. (*The pilot also sustained a whiplash type injury to his neck muscles because his feet were higher than his head on parachute opening.*)

"My oxygen did not work so I jerked off the mask.

"During the trip down I had the sensation of floating. I released the right side of my seat pan and checked to see if it was OK. (*This is incorrect procedure—release the left side first so the raft drops around to the right.*) I got my .38 out and fired three rounds at the ship. I decided to save the remaining two rounds and put the .38 back in the holster. I pulled out my pencil flare gun and fired two rounds from it. I was getting close to the water by this time so I put the flare gun back. I saw the ship turn toward me as I hit the water.

"The chute started to drag me and I had a lot of trouble getting the rocket jet fittings loose. I still had my flight gloves on and they were causing me to slip around the release mechanism. I thought I had released the right fitting and I concentrated on the left one. As soon as I got it loose, I followed the line to my seat pack and started to retrieve my life raft. I was all wrapped up in shroudlines so I got out my survival knife and cut them away. I got the raft out and inflated it. I then discovered that I was still hooked to the parachute by the right fitting (the chute had obviously collapsed earlier). I released the fitting and then got in the raft with no difficulty.

"The ship passed by close and a crewman shouted to me and told me to hang on and they would drop a boat. I set the sea anchor and got out a day distress signal. I expended my .38 tracers and pencil flare rounds to give the ship a reference to my position. As the small boat proceeded toward me, I shot the day smoke distress signal. They approached alongside the raft and attempted to pull me aboard. I had to puncture the Mk-3C to facilitate getting in the boat. I was taken to the ship."

Aboard ship, a commercial vessel, the pilot radioed to a C-54 to pass on the word that he was okay. He was picked up from the ship in the Gibraltar Straits by a helicopter three days later.

ANTARCTIC SURVIVAL

AFTER a JATO accident in late afternoon in the Antarctic, an LC-47H crew managed to land the aircraft on a snow-covered ice glacier. There was no fire so after exiting the plane, the crewmembers re-entered to remove all survival gear.

Fifteen minutes after the now-wrecked plane had taken off from Lillie Glacier, a second LC-47H had taken off and was overhead. The survivors indicated with flares and hand signals that there were no injuries and that they were preparing to set up a survival camp. The orbiting LC-47H could not land to rescue the downed crew because of lack of JATO on board for an additional takeoff. It headed for Hallett Station to refuel and load.

In the meantime, two of the survivors had broken out two four-man survival tents, erected them and shoveled snow around the bottom edge to seal them down. Other crewmembers drained out engine oil for a signal fire and broke out signal flares which they put on the banana sled for instant use. After the tents were set up, the survivors determined the prevailing wind direction and all hands cut snow blocks for a wall around the tent area.

One of the pilots started the cookstove and, according to the accident report, a crewman cooked "New York style clam chowder" and coffee. All equipment was moved behind the snow block wall to protect it from the O° C. temperature and prevailing wind. At 1900 all crewmembers blew up their air mattresses and started to unroll their sleeping bags in preparation for spending the night.

At 1930, the LC-47H returned to the scene and made a low pass over the area. The survivors used flares, smoke signals and mirrors to attract the rescue crew's attention. The LC-47H landed adjacent to the wreckage and all survivors boarded for the return to Hallett Station.

The accident report states that "the crew members did an excellent job in establishing their survival camp in anticipation of spending the evening to several days on the snow-covered ice glacier with impending weather changes which frequently occur on the Antarctic Continent. It was a direct reflection on the utilization of training received through the year."

Ejection Seat Sense

A RECENT AAR revealed that the pilot did not know the ejection sequence of his aircraft's escape system. Thankfully, he did not have to rely on any alternate means of escape and the seat

worked as advertised. This points out the distressing revelation that there may be other pilots who do not know the ejection sequence and procedures.

OpNavInst 3740.3B requires seat checkouts once every four months. This may not be often enough for pilots who fly only once or twice a month. Make sure that your pilots *know* the ejection system and its capabilities cold. An emergency situation is no time for learning! (Note: While you're at it, you might place a lot of emphasis on survival training and the use of the "goodie pack" found in the ejection seat pan!)

—MARTC Aviation Safety Summary NAS Glenview

Up a Tree

PARACHUTE descent after ejection was described by the pilot as "normal" except that the drogue parachute slug and line hit his hard hat twice before he caught it. The wind blew him toward a four-mile-square wooded area. When his parachute caught in the treetops, he hung suspended 30 feet above ground between two 50-foot trees, four feet apart. Using the drogue line and slug, hanging beside him, he caught a limb on the larger tree and pulled over to it.

Clinging to the tree, he released three parachute fasteners. Then after making sure the tree would support his entire weight, he undid the remaining fastener and climbed down.

He was subsequently located by an SAR helo.

Visors

DURING a recent refueling incident, an F-8 canopy was shattered by a refueling drogue. The pilot's hard hat visor was down and damage to the visor indicated that it prevented a serious eye injury.

Recommendation: That squadrons provide clear visors to pilots for night operations. The tinted visors may be easily replaced by the clear visor prior to night flights. Several squadrons routinely do this. Reemphasis of the necessity of wearing the visor down during refueling seems appropriate.

—USS FORRESTAL *(CVA-59) Safety Council Meeting*

Secure Strobe

AFTER a night pickup of a downed aviator, the survivor's flashing strobe light caused some "consternation" to the pilot of the rescue helicopter. Helicopter crewmembers should be briefed to secure rescuees' strobe lights when safely aboard the helicopter.

Stay Keen

WHILE the pilot was completing his preflight check, an F-8E was at idle power. The aft catapult safety petty officer ducked under the aircraft's intake duct. As he did so, his head was drawn up toward the intake. With presence of mind, he fell to the flight deck to escape the suction. His green "Mickey Mouse" helmet and ear protectors were sucked into the intake and ingested by the engine. He was not positive that he had fastened the chinstrap on his "Mickey Mouse" helmet.

The lessons to be learned from this incident are not new, the investigators state in their report. "Factors such as fatigue and insidious carelessness brought about by constant exposure are routine to flight deck operation." (Fatigue was considered a contributing factor since the catapult crew had been off duty for only a few hours during the 30 hours preceding the mishap.)

Danger is inherent in flight deck operations and the requirement for ever alert, well indoctrinated supervisors is imperative.

Flashlights

IT has been noted that VP aircraft personnel on night flights are removing the flashlights from the life vests for general use and are leaving them lying about. Squadron safety officers and flight training officers will brief all personnel concerned to discontinue using mae west flashlights for general use. Proper flashlights are available for issue.

—CNAResTra Council Minutes

Hits Head

THE pilot of a helicopter which crashed in the water struck his head on the cabin step of the rescue helo while being hoisted. *He was uninjured because he was still wearing his APH-5 helmet.*

Hot Meals

THE council flight surgeon brought out the problem of flight crew personnel being unable to procure a hot meal at X Field when scheduled to fly at extra-early hours or when arriving generally from flights at late hours. It is felt that at a 24-hour, all-weather station, hot meals should be available, especially where fleet units are training and being trained. The hot cans from vending machines are not acceptable. Figures on just how many meals would be necessary on the average are to be obtained and the feasibility of these hot meals will be checked with the NAS supply officer.

—Safety Council Minutes

Observers have called carrier flight deck operations the greatest show on earth. The success of these operations depends largely on factors such as organization, training and experience of the flight deck chief. Full of know-how, can-do, confidence and carrier sense

HE STANDS WITH PRIDE

By G. Lechak, ABCM

Admiral Marc A. Mitscher was perhaps one of the most famous task force commanders in the Pacific during World War II. Frequently he was seen on the open flag bridge as he observed aircraft operations—his trademark was a khaki baseball cap, a scowl and a keen appreciation of the far ranging fast carrier strike force.

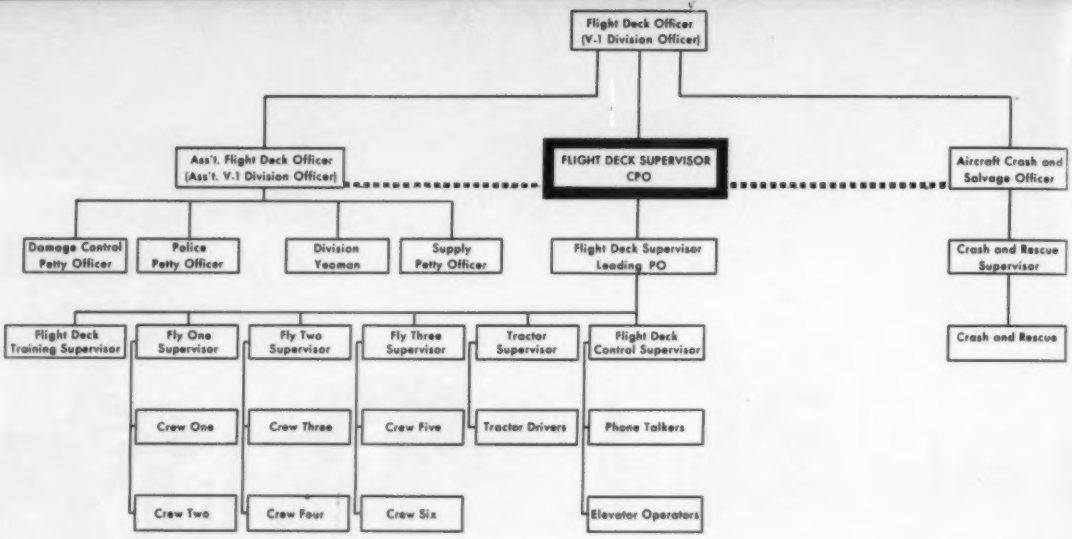
If Admiral Mitscher were alive today and chose to visit one of the new attack carriers he would undoubtedly be overwhelmed not only by developments since World War II, but also by the complexity, tempo and precision of carrier evolutions. Even the size and shape of the flight deck has changed. He would probably be astounded in seeing the many flight deck crew components doing so many seemingly uncoordinated tasks with so little visible leadership. Every movement would appear preplanned and precisely executed. And what about this thing called a cycle? In the old days 25 to 30 prop aircraft were launched on a 4- to 6-hour mission. While they were gone, everyone waited expectantly for their return. When the planes returned they were made ready for another flight. Normally there were no launches in between. Now, the objective seems to be a continuous cycle of launch, respot, recover, respot, launch. . . . How do they do it? Four catapults? Jets?—Everything would seem bewildering until the Admiral spotted an old familiar sight—a yellow jersey with "FLIGHT DECK CHIEF" stenciled on it. Undoubtedly, the Admiral would relax a bit.

The Flight Deck Chief has been around as long as the aircraft carrier—in fact one or two perhaps a little bit longer. All received their training the hard way—from years of hard work, personal sacrifice and a multitude of experiences. As responsibility was assigned they developed the leadership necessary to complete tasks as they were assigned. One might say that they are indispensable self-made men. Let's take a look and see what a good Flight Deck Chief considers the tools of his trade that can be used by others in the profession. Most of the Flight Deck Chiefs call this "Carrier Sense."

A Flight Deck Chief knows that a carrier deck is one of the most hazardous places in the world. As long as a man is aware of these hazards and observes the precautions, then the hazard won't turn into danger. For example: A turning propeller represents a

SUPER . . . VISOR

A leader is best
When people barely know that he exists,
Not so good when people obey and acclaim him
Worst when they despise him.
'Fail to honor people,
They fail to honor you.'
But of a good leader, who talks little,
When his work is done, his aim fulfilled,
They will all say, 'We did this ourselves.'



V-1 DIVISION ORGANIZATION

hazard to flight deck personnel. It becomes a danger when one *unintentionally* gets near it. *The Flight Deck is only as dangerous as you make it.* To reduce the chance of changing a hazard into a dangerous situation:

1. Constantly evaluate the ever-changing situation and reduce each task to positive heads-up action. Do it at the earliest possible moment and do it right.
2. Look out for the other man first.
3. Develop a team effort—no man can do it alone.

Molding team spirit is not an easy task. To accomplish this, the Chief must first set a favorable example for his subordinates to follow. He must show confidence in both his subordinates and his seniors and display sincerity and conviction in his orders. Young airmen beginning their Navy careers on the flight deck will look up to this man with an attitude of calm assurance and confidence.

Next, the Flight Deck Chief must insist that a good division organization structure exists and is stated in a division organization manual. This manual must not be filed on an office shelf gathering dust. It must be a *useful* working publication to inform the crew about their duties, responsibilities, authority, and their organizational relationship. Every man must know where he is in the organization. Otherwise arguments will break out within the team on these matters. Arguments based on ignorance have often been the catalyst of an unhappy organization. A sharp Flight Deck Chief won't let this happen to him.

With an organization structure drawn up, the Flight Deck Chief must then formulate operating procedures that are sound, safe and enable the flight deck crew to operate with maximum efficiency. To do this he gathers techniques in nearly every form available: directives, instructions, technical publications, etc. Subordinates can supplement the Chief's procedures or techniques. As much of this information as possible should be included in his division's informal training lectures and formal training outlines.

Advancement programs, a subject dear to the hearts of his men, must also be provided for within the Flight Deck Chief's organization. Such advancement programs set goals for his men and provide tremendous incentives for bettering performances. The program must be particularly directed toward the airman apprentice. The time to start is when he reports to the flight deck. Who knows—perhaps after proper instruction, advancement, and reward for a job well done, he too will one day become a Flight Deck Chief.

Experience has taught the Flight Deck Chief that he must be the senior supervisor of his men. He must be one that is not only conscientiously concerned with every detail of his duties, but also one that realizes that he cannot do the whole job alone. He must insist on having but one reporting subordinate: the Leading Flight Deck Petty Officer. Together, they must supervise the flight deck until the very last man knows thoroughly what his job is and who his immediate superior is. As senior supervisor, the Flight Deck Chief must initiate programs, monitor existing programs, and most important, *act as principal observer, inspector and evaluator of his men's performance.*

Author Lachak, foreground right, aboard ENTERPRISE as Flight Deck Chief.

The Flight Deck Chief puts in a full day—everyday. He is not only the key to the V-1 team but is also an indispensable contributor to the Air Department team. To assist, he should be aware of all Air Department programs and be willing to assist whenever called upon to do so. Sometimes this is not easy since the demands of his own division may require his full attention.

All the efforts of the Flight Deck Chief are in vain unless he and the Flight Deck Officer have a good working relationship. The first step to good relations between the Chief and the Officer should be for each to insure that they know each other's duties as stated in the division's organization manual. If the officer is less experienced in handling large groups of men or is not a professional aircraft handler, the Flight Deck Chief must be able to advise the officer of the capabilities and limitations of his men and equipment. He must point out problem areas and provide assistance. He must maintain a close working relationship with the Aircraft Handling Officer. A good Flight Deck Chief will always discuss both the background and the future ramifications of any proposal that he presents to his division officer. This is especially important during the indoctrination of any new Flight Deck Officer. It is perhaps the most important step in establishing mutual confidence between the two—the whole flight deck team will benefit.

The Flight Deck Chief's time in port is an extremely important function. He uses this time to conduct maintenance of assigned spaces and repair equipment. He also realizes that every minute explaining and instructing pays off in flight operations by creating a better informed and qualified division. At these times, he also cannot afford to neglect the personal problems of his men. The Flight Deck Chief must handle their requests and insure that time is available for counseling. He is firm in his conviction that in-port disciplinary problems have a direct relationship to a sloppy attitude of his crew at sea. The Flight Deck Chief can't afford this.

Perhaps by this time you are wondering just where the time will come from to accomplish all that is expected of a good Flight Deck Chief. The secret is in the organization. First, an organization must exist in which everyone knows his duties, responsibilities and authority. Second, the organization *must* be made to work. This means that subordinates must have the trust and confidence necessary for them to discharge their duties. Demands for quality and performance should be supplemented by praise and reward for a job well done. Third, the Flight Deck Chief must be a supervisor. With a sound organization that is made to work, subordinates handle the nuts and bolts of assigned tasks. The Chief is then free to direct and coordinate tasks, personnel matters, training, and counseling. In short, his organization will run with precision.

Perhaps in response to the admiral's question of "How do they do it?" we would answer, "See that man on the flight deck there? That's right—the one in the yellow shirt stenciled FLIGHT DECK CHIEF. He's the key. He's got organization, procedure, and carrier sense. We are proud of him."

CRUSADER vs

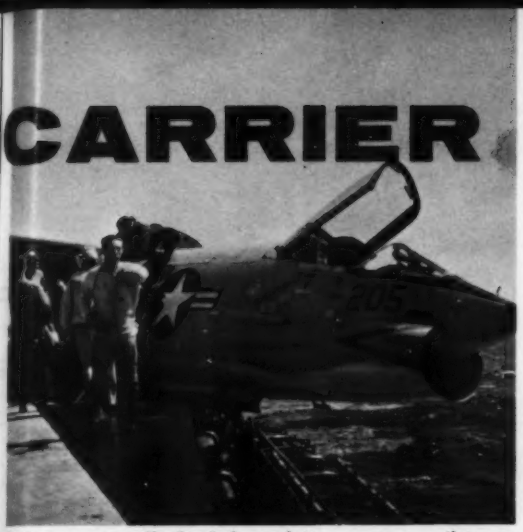
LCDR W. W. Sharpe
ASO School, University of Southern California

This title may suggest either a law suit or prize fight, neither of which is correct. Instead it shall serve as the basis for a discussion of some aircraft handling procedures involved on the flight deck. Although the F-8 is cited in this article, a good deal said is also applicable to other aircraft.

A pilot begins preparation for a flight two hours prior to launch. He mans his aircraft on the flight deck 30 minutes before the launch to preflight, start and check out his systems. He does this with care since his life could depend on it. Then he either sweats in the heat or freezes in the cold waiting his turn to be shot into the wild blue. His turn comes and he taxis out of the pack under the guidance of a director.

"CRUNCH!"

Inattention or improper spotting of the aircraft



F-8's nosegear well aft of the cockpit can worry a pilot near the deck edge.

causes the loss of a sortie and some unscheduled maintenance.

The F-8 has several characteristics which demand special attention when spotting and taxiing for launch. The landing gear is located about two thirds of the distance down the fuselage and a very small distance apart. Add to this condition 57 feet of flat surface and this combination makes it a very difficult airplane to taxi with wind over the deck. If the longitudinal axis of the aircraft is greater than 45 degrees to a relative wind of 30 knots or more, brakes and nose gear steering may not be able to bring the plane into the wind unless a high power setting is used. This can result in blasting other aircraft and possibly damaging their movable surfaces. More serious, the people can be blown into another aircraft or even over the side. High wind angles on the still folded wings can also cause wing flutter, resulting in worn and cracked wingfold hinges and requiring major repair.

The latter can be avoided by parking the F-8 so that the aircraft is not subjected to excessive winds. While it is impossible to avoid high relative wind angles at all times, directors and the handling officer can decrease the sorties loss and aircraft damage by studying the F-8 handling characteristics.

The *Crusader's* narrow gear and large broadside surface make it particularly vulnerable to jet blast from other aircraft. Let me illustrate: One day aboard a FORRESTAL class carrier I was behind an A-3 waiting to get on no. 3 catapult and parked about 60 degrees to his blast; waiting to be directed onto no. 4 catapult. The A-3 turned up to proceed over the shuttle and needed high power to maneuver in response to the spotting director. The deck was slippery from arresting gear grease and my plane started sliding sideways—even though the brakes were locked. The plane slid helplessly for 12 feet. When it stopped, 14 inches of F-4 nose cone was imbedded into the side of my aircraft. My F-8 would have probably gone over the side were it not for the F-4. Furthermore, it was in a down status for 8 days because a replacement part was not immediately available. *(In another case the pilot and an A-4 were lost over the side.—Ed.)*

Tempo of operations often degrades normal precautions used on the flight deck. While in the South China Sea 39 aircraft on a particular launch were involved directly with the mission in various capacities. The mission called for aircraft to be launched in a certain sequence allowing each element to proceed with the least amount of delay in interest of fuel conservation. A 39-plane launch required in minimum time in a specified sequence with 40 knots of wind over the deck is not normal nor desired by the aircraft handling officer.

To cope with the problem, F-8 photo aircraft were placed behind no. 2 catapult about 45 degrees to the bow, 3 aircraft were parked parallel. When the launch commenced, A-4s were taxied on the starboard side to the no. 2 catapult. When the tie-downs were removed from the F-8s, an A-4 was being positioned on the catapult using power to make corrections. The A-4's blast coupled with strong winds caused the nearest F-8 to swing into the no. 2 F-8 resulting in extensive damage to both aircraft and cancellation of two-thirds of the photo mission.

Parking aircraft too close together often results in damaged control surfaces when pilots are going through their post-start check-off list. Although such

Narrow-gauged landing gear well aft coupled with large sail area makes F-8 difficult to taxi.

Nonstandard director signals can confuse a pilot.

a mishap is not common, several instances have been noted, especially when breaking in new flight deck crews, pilots and plane captains.

Nonstandard director signals can cause pilot confusion and create accident hazards. Pilots should report any discrepancies to the aircraft handling officer for immediate correction.

Aircraft Handling Signals prescribed by NWP 41 (A) Naval Air Operating Procedures are available in poster form, see illustration. Also available are Helicopter Launch and Recovery Signal Posters. For copies, write Commander, U. S. Naval Aviation Safety Center, Naval Air Station, Norfolk, Virginia, 23511, Attn: Safety Education Department.—Ed.

During periods of darkness, each one of the preceding examples are magnified by the loss of visual references. The accident potential takes a tremendous increase, and requires extra precaution on the part of both pilots and crew.

Launches in darkness normally involve fewer aircraft. The foremost reason is the night recovery interval of the aircraft—but this matter is not within the scope of this discussion. Lack of depth perception at night results in error of distance judgment. To compensate for this deficiency, small launches with additional spacing between parked and taxiing aircraft should be standard. The directors must make slower movements with the lighted signal wands to insure the pilot understands clearly the intent of the given signal. A problem which sometimes gets out of hand when not constantly stressed, is the directors moving on the deck while giving taxi signals at night. This gives the pilot the illusion he is not moving his aircraft since there is no relative motion between the director and the aircraft. The pilot tends to add more power to respond to the director's signals. When the director stops the pilot then realizes that he's moving much too fast. Thus, the accident potential is increased.

The *Crusader* has one feature which causes the pilot to be nervous at night. The nose gear is located behind the cockpit, so when taxiing close to the deck edge or turning around on an elevator for lowering to the hangar deck, the pilot can actually be out over the water. He becomes uncomfortable and very hesitant to get into this position. Especially if there is a strong wind over a deck that is slippery from grease, rain or worn nonskid. At a time like this he'll move—but slowly. Don't be impatient, he's in command of that airplane and has a right to move it slowly.

The problems involved are a product of flight deck crews, pilots, weather, a pitching deck, and last but far from least, tempo of operations. These are elements of the carrier environment and for the most part cannot be altered. But pilots and crews can decrease the number of crunches and hazards through effective training, cooperation, and doing the job in a professional manner—should the whistle blow it may mean a sortie launched instead of scratched.

AIRCRAFT HANDLING SIGNALS

TILLER BAR IN PLACE: Hold cane with left hand, right hand moving horizontally at waist level.

MAN TENDING BAR: "Thumbs Up" immediately following signal "Tiller Bar in Place."

NO ONE TENDING BAR: "Thumbs Down" immediately following "Tiller Bar in Place."

HARD TURN: Hand extended, fist clenched for locked brakes.

EASY TURN: Hand extended, open in direction of turn.

LEFT TURN: Pull desired wing around with regular "Come Ahead." Point at opposite brake.

RIGHT TURN: "Left Turn" signal reversed.

EMERGENCY STOP:
DAY — Cross forearms overhead with fists clenched.
NIGHT — Cross signaling wands.

SLOW DOWN: Raise hands to waist level, palms down, and execute a downward patting motion.

STOP: Raise both hands to eye level, palms to pilot, in policeman's "stop."

LOCK TAIL WHEEL: Hands together overhead, palms open from wrist to form "V," then suddenly closed.

UNLOCK TAIL WHEEL: Hands overhead, palms together, then opened from the wrists to form a vertical "V."

FOLD WINGS: Arms straight out at sides, then swept forward and hugged around the shoulders.

SPREAD WINGS: Same as "Fold Wings" but reversed.

UP HOOK: Raise right fist suddenly, thumb extended upward, to meet horizontal palm of left hand held in front of body.

LOWER WING FLAPS: Hands in front, palms together horizontally, then open from wrists alligator-mouth fashion.

RAISE WING FLAPS: Hands in front, horizontally, with palms open from wrists, then suddenly closed.

COME AHEAD: Beckoning motion, hands raised, palms toward face. Rapidity of hand motion indicates plane speed desired.

CUT ENGINES: Draw forefinger of either hand across throat in "cutthroat" gesture. For multi-engined aircraft, point to engine meant with other hand.

START ENGINES: Give "Emergency Stop" to ensure that brakes are on. Then point at engine to be started while moving other hand in clockwise cranking motion.

INSERT CHOCKS: Sweep fists together at hip level with thumbs extended and pointing inward.

PULL CHOCKS: Give "Emergency Stop" to ensure that brakes are on. Then reverse "Insert Chocks," with thumbs pointed outward.

TURN OVER COMMAND: Both hands pointed at next signalman — arm extended, one at chest.

OPEN COWL FLAPS: Hold Hands against side of head, then open by moving thumbs forward and outward.

INSTALL DOWNLOCKS: Clasp forearms with hand.

REMOVE DOWNLOCKS: Unclasp hand from forearm.

ENGAGE NOSEGEAR STEERING: Point to nose with index finger while indicating direction of turn with other index finger.

THUMBS UP: Fist at shoulder level, thumb pointing up. Given by pilot when he desires to start engine or taxi. If all is clear, same signal is reply.
NIGHT — Extinguish one wand, sweep other to "Thumbs Up" position.

THUMBS DOWN: Arm extended at shoulder level, fist with thumb pointing down, signal means something is wrong.
NIGHT — Extinguish one wand, sweep other to "Thumbs Down" position.

CONNECT AUXILIARY POWER UNIT: Hold extended index finger of right hand against the flat palm of vertical left hand. (Instructed by pilot; repeated and executed.)

DISCONNECT AUXILIARY POWER UNIT: Pull extended index finger of right hand from the palm of left hand. (Initiated by pilot; repeated and executed.)

CONNECT AIR STARTING UNIT: Hold extended index and middle fingers of right hand against the flat palm of vertical left hand. (Instructed by pilot; repeated and executed.)

DISCONNECT AIR STARTING UNIT: Pull extended index and middle fingers of right hand from the palm of left hand. (Instructed by pilot; repeated and executed.)

WING UP: Both arms extended horizontally in front of body, palms down. Raise arms to 45-degree angle.

WING DOWN: Reverse "Wing Up" signal.

LOCK WINGS: Hit right elbow with palm of left hand.

OPEN ROCKET PODS: Right arm extended with palm down. Left arm extended with palm up and about six inches directly below right hand.

CLOSE ROCKET PODS: Same as "Open Rocket Pods," but with hands brought together.

OPEN BOMB BAY: Lean over with arms hanging as if around a barrel, then open arms.

CLOSE BOMB BAY: Same as "Open Bomb Bay," but close arms.

OPEN DIVE FLAPS: Hands in front, palms together vertically, then opened from the wrists alligator-mouth fashion.

CLOSE DIVE FLAPS: Hands in front, vertically, with palms open from wrists, then suddenly closed.

ROLL BACK: With arms raised, palms open, make pushing motion at plane.

DAY

I HAVE COMMAND: Director holds one hand open with palm forward, motionless high overhead.

NIGHT

I HAVE COMMAND: Director holds one hand, with wand, motionless high overhead.

AIRCRAFT HANDLING SIGNALS

Bul. NAV 40 (5)

NAVAIR 00-80T-113

For full size signal posters, write Commander, NASC, Attn: Safety Ed Dept.

Do it right the first time—the cost of a job well done is much more easily sustained than the price paid for the lack of it. For proof, review these.

96

MAINTENANCE GOOFS

The saying "Never enough time to do the job right, but always enough time to do the job over" isn't necessarily so.

Four errors, in themselves no more serious than the others, resulted in the loss of four aircraft—two A-4s, an F-9 and a RA-5C. These maintenance-error caused strikes cost us $8,042,000—and there's *no chance* of doing these jobs over! This was the situation during the second quarter of fiscal '65 when 96 maintenance errors were committed.

In addition, an F-4 and an A-4 received Bravo damage costing $455,000 and $75,000 respectively. While these six goofs add up to lots of cold cash, the impact of such losses in mission-readiness in times like these is felt equally hard, if not more so. What we're trying to get across in the nuts and bolts world of naval aviation is that a simple goof such as a cotter pin omission, leaving a tool adrift, improper staking of an oil plug or failure to check a circuit can be a most serious matter. Generally speaking, our birds can be forgiving but under the right circumstances these goofs can be fatal. The photos illustrate this point. Keep in mind as you look over this list of whodunnits that anyone of them could produce results just as dramatic and tragic as those we've just covered.

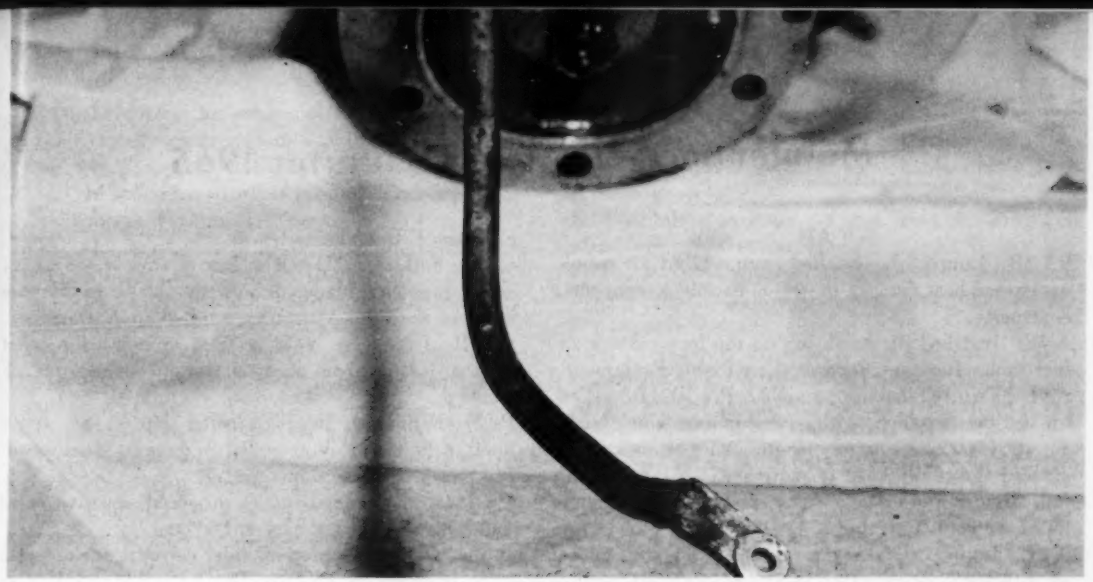
Now to take a look at the overall picture and compare the first two quarters of the fiscal year. Here are the high points—Table I gives a complete breakdown:

TABLE I DAMAGE* & COST

*A—Strike C—Substantial
B—Overhaul D—Minor
E—Limited

	A		E
A-4	$729,000	A-3	$ 3,000
F-9	275,000	F-8	1,600
A-4	583,000	T-28	450
A-5	6,455,000	T-28	450
	$8,042,000	P-2	1,400
		P-3	4,080
	B	C-54	1,200
F-4	455,000	A-1	450
A-4	75,000	A-1	450
	$530,000	A-4	750
		A-6	1,250
	C	F-1	1,500
A-4	18,800	F-8	1,100
T-28	11,300	F-8	1,600
P-2	35,000	HR	3,040
C-45	8,800	S-2	1,000
F-4	113,800	S-2	1,000
A-6	125,000	P-2	1,820
F-8	40,000	P-3	4,080
	$352,700	F-8	1,600
		T-1	600
	D	A-4	950
F-1	15,000	A-4	750
F-8	11,000	A-1	450
F-4	45,500	A-3	3,000
F-8	11,000	A-4	750
F-8	16,000	A-4	950
S-2	18,200	A-4	950
S-2	10,000	S-2	1,820
A-4	9,500	C-54	1,200
F-8	16,000	A-4	950
	$152,200		$44,190

Total $9,121,090



FOR THE WANT OF A COTTER PIN Nut and bolt securing this fuel control throttle linkage terminal dropped out in flight causing flameout in the landing pattern. Pilot ejected but the F-9 was a *strike!*

Number of maintenance errors: 96, **up** from 84.

Dollar Losses: $9,121,090, **up** from $863,040.

Strikes: 4, **up** from 1.

Bravo Damage: 2, **up** from 0.

Charlie Damage: 7, **up** from 1. Cost: $352,700, **up** from $40,000.

Delta Damage: 9, down from 10. Cost: $152,000, **up** from $124,000.

Model aircraft involved most frequently:

	2nd Qtr.	Last Qtr.
A-4	20	19
F-8	13	6
P-3	11	4
F-4	10	6
S-2/C-1	8	6
H-34	0	8

So much for the hardware, let's recap the ratings and people involved:

ADs committed 36 errors this quarter compared to 9 last quarter; AMs—26, up from 22; AOs—13, down from 15; Plane Captains—12, down from 13; Others (O&Rs, Transient Service, etc.)—6, down from 18. Table II offers a complete breakdown as does the listing of briefs.

After reading these we're sure you'll agree that attention to detail appears to be the most needed ingredient in this phase of safety in naval aviation.

continued

Table II
Maintenance Errors by Rate and by Aircraft

Rating / Aircraft	AD	AM	AT	AE	AO	P/C	Other	Totals by Aircraft
A-1		2			1	1		4
A-3	1					1		2
A-4	3	2	1		8	4	2	20
A-5							1	1
A-6		1				1		2
F-1	1	1						2
F-4	3	1			3	1	2	10
F-8	4	6	1			1	1	13
F-9	2							2
F-10								0
T-1				1				1
T-2								0
T-28	2	1						3
T-33								0
H-2		1						1
H-3	1				1			2
H-34								0
S-2/C-1	2	5				1		8
P-2	2	2						4
P-3	7	3				1		11
P-5								0
C-45		1						1
C-54	1					1		2
C-117								0
C-119								0
C-121	6							6
C-130								0
C-131								0
E-1								0
E-2								0
U-16	1							1
Totals by Ratings	36	26	2	1	13	12	6	96

Maintenance Errors 2nd Quarter 1965

AD

RA-3B Improperly installed engine bleed air coupling caused heat damage to engine nacelle components. E Damage.

A-4E Installed the bomb lug on the forward side of fuel tank. The tank separated in flight. F Damage.

A-4B Two self-locking nuts NAS PN 1021D3 called for had been replaced with steel stop nuts which backed off from the engine throttle plate screws. This allowed throttle linkage to move outward against the flow divider and selector valve, restricting movement to 87 percent and above. F Damage.

A-4E Improper staking of oil manifold plug allowed it to back out resulting in loss of adequate lube to engine bearings. A Damage.

F-1E Maintenance personnel failed to remove the intake duct cover before turning up. The duct and engine were damaged. D Damage.

F-4B Used excessive force to install drop out link. B Damage.

F-4B The no. 3 bearing oil scavenge pump flexible drive shaft was inserted between the struts of the cooling air baffle, and not into the female spline. F Damage.

F-4B A cotter pin was not installed into the afterburner actuator rod connecting pin. The nozzle assembly shifted aft. F Damage.

F-8B The fuel pump was misaligned during installation. F Damage.

F-8B Intake screen was tied on instead of properly secured with lock pins. D Damage.

F-8E Improper security of access panel caused separation in flight. E Damage.

F-8E Improper installation of engine bleed air shut off valve. Heat damage resulted. F Damage.

TF-9J Overtorque of sump plug bushing caused threads to strip allowing bushing to detach. All engine oil lost. F Damage.

QF-9G Failed to install cotter pin and nut. The engine flamed out in the landing pattern. A Damage.

T-28C An improperly secured engine cowling was lost in flight. E Damage.

T-28C Improperly secured engine cowling separated in flight. E Damage.

SH-3A Undertorque or failure to torque fuel oil heat exchanger fitting resulted in F Damage.

S-2D Bolts connecting the exhaust pipe connector to the cylinder were overtorqued causing bolt failure and loss. F Damage.

C-1A Failure to install a barrel support shim on no. 1 propeller blade allowed the blade to become loose in the hub. Vibration resulted in F Damage.

SP-2H Crankcase main section, to crankcase front section bottom bolt sheared due to overtorque. F Damage.

P-2E Failure to install a cotter pin in the flight hood of no. 1 turbine resulted in exhaust gases burning the cowling. E Damage.

P-3A Undertorqued screws on speed sensitive valve plate allowed oil leakage. F Damage.

P-3A Damage to prop oil filler cap seal during servicing resulted in oil loss. The propeller pump light came ON in flight and the engine was secured. F Damage.

AVAILABLE—A complete recap and analysis of all maintenance and servicing errors occurring during fiscal 1964. For additional copies write Commander, NASC, Safety Education Department, Norfolk, Virginia 23511.

P-3A Incomplete assembly not indicated by tag in cockpit. Faulty quality control procedures. The propeller was damaged on engine turnup. E Damage.

P-3A Improper securing of prop oil filter cap allowed oil leakage. F Damage.

P-3A Damaged seal during inspection installation, caused inflight loss of oil. F Damage.

P-3A Improper servicing of the propeller system. The oil was not topped off. F Damage.

P-3A Improper adjustment of propeller feather control linkage. The propeller failed to feather. F Damage.

C-54 Misalignment of exhaust pipe clamp assembly allowed exhaust to separate from cylinder and hot exhaust gases burner carburetor air scoop. E Damage.

C-121 Failure to install and lock-wire oil line interconnectors at no. 11 oil intake rocker box during check. F Damage.

EC-121 Rocker-box drain interconnector at no. 6 cylinder was improperly installed. F Damage.

EC-121 An upper piston installed in lower cylinder caused a valve failure in flight. F Damage.

EC-121 The lock tab was bent in the wrong direction allowing oil leakage and caused an inflight fire. F Damage.

EC-121K Failure to secure oil sump plug. All oil was lost. F Damage.

C-121 Improperly seated preflight hood clamp. Exhaust gases caused a fire warning indication. F Damage.

HU-16D Carburetor vapor vent line not properly tightened. An inflight fire resulted. F Damage.

AM

A-1H An improperly secured port horizontal stabilizer fairing separated from the aircraft in flight. E Damage.

A-1H Rudder tab unit drum was removed during routine maintenance and not properly reinstalled. E Damage.

A-4C Improper installation of ASC. The shop supervisor failed to insure the airman could handle the job. E Damage.

A-4C Improper shock strut servicing. The strut broke off on CV landing. C Damage.

A-6A Jettisoned the canopy while trying to drop the tail hook. E Damage.

AF-1E The canopy initiator was inadvertently fired. E Damage.

F-4B Improper servicing of landing gear tires with air vice nitrogen. D Damage.

F-8A Maintenance crew failed to install the wing jacks or deflate the struts following damage by arresting wire. D Damage.

DF-8F Improperly serviced shock strut. The starboard strut failed on takeoff. F Damage.

F-8C The canopy actuator was inadvertently fired. E Damage.

F-8E Failure to remove a tool from the wing tank after repair. E Damage.

F-8E *Murphy's Law*—Cross-connected NLG actuating cylinder hydraulic lines. The gear collapsed during taxi. D Damage.

F-8C Hydraulic tee fitting was installed so that it caused binding controls. E Damage.

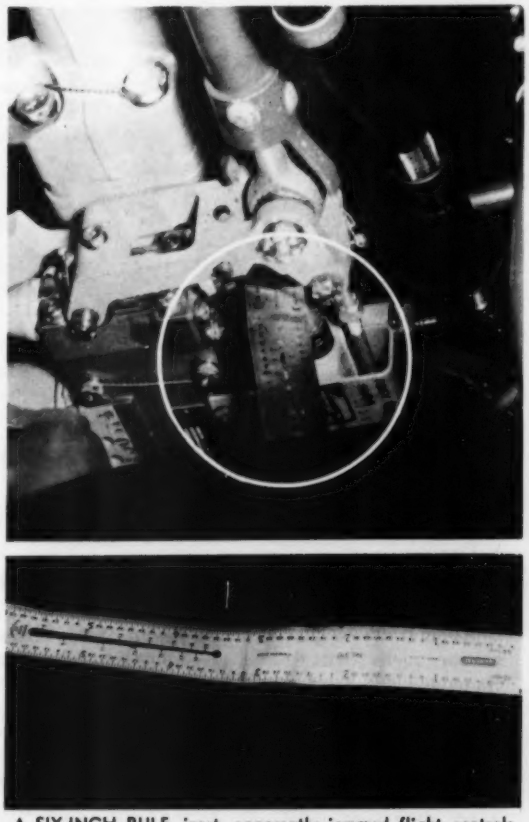
T-28C Cotter pin left out of the nose landing gear linkage. A wheels-up landing was made. C Damage.

UH-2A Loss of servo flap support rod retaining nut. An oversize nut had been installed. E Damage.

S-2F Starboard wheel bearing disintegrated due to improper lubrication. E Damage.

S-2F Nose landing gear collapsed due to improper check procedures. E Damage.

C-1A An aileron jammed in flight. Loose bolts,



A SIX-INCH RULE, inset, apparently jammed flight controls (circled) of an RA-5C at low altitude forcing its crew to eject for an over 6-million-dollar loss.

nuts, and wire were found in the wing root area. F Damage.

S-2E Maintenance personnel serviced a strut with the tiedowns attached. The tie-down ring was pulled from the aircraft. D Damage.

TS-2A *Murphy's Law*—Reverse installation of wing-fold spread relief (priority) valve. The wing spread on the lock pins. D Damage.

SP-2E Fire caused by shorting an electric circuit with a wrench. C Damage.

SP-2H Painting interior of aircraft with electrical power applied. Navigator's flex light resting on head rest ignited the fabric. E Damage.

P-3A Outboard brake assembly was damaged upon removal. E Damage.

P-3A Windshield wiper tube cracked at tube bend (2 aircraft). The tubes were crimped during installation. F Damage.

TC-45J Port main landing gear would not extend on landing. The drive chain attach bolt was missing. C Damage.

AT

A-4B Electrical connectors improperly stowed—300-gallon external tank jettisoned when rocket release actuated. F Damage.

F-8D Failure to properly secure access door caused loss in flight. E Damage.

AE

T-1A Improper routing of a wire bundle. E Damage.

AO

EA-1F Failure to properly load store or excessive tightening of Aero 14E bomb rack/rocket launcher caused F Damage.

A-4C A Sidewinder missile was loaded on the launcher prior to completing the missile circuit test. Failure to remove the non-propulsion attachment after loading the missile resulted in A Damage.

A-4E Access panel not secured prior to flight. E Damage.

A-4C Failed to disconnect electrical leads to Aero 7A rack and reattach cables to MBA A/A 37 B-1. F Damage.

A-4C Live ammunition was cycled through 20MM guns causing F Damage.

A-4C Failure to pull the safety pins in the bomb ejector racks prior to a night launch caused F Damage.

A-4C Overtightening of MBR AA 37B-1 rack attach bolts caused hooks to bind. F Damage.

A-4E *Murphy's Law*—Bomb release primary and emergency electrical leads crossed. F Damage.

A-4C Failure to perform a no-voltage check resulted in E Damage.

F-4B Attempting to install an LAU-17/A pylon that was not electrically compatible with aircraft resulted in F Damage.

F-4B Ordnancemen inspecting RMU-8A tow system on preflight failed to correct low-air pressure deficiency in tow system. Crew preflighting aircraft actuated power switch driving propeller 58.3° in a counter-clockwise position causing C Damage.

SH-3A Failure to make proper electrical connections and install safety pin resulted in F Damage.

F-4B A *Sparrow III* missile was improperly labeled as to model. E Damage.

Plane Captains

A-1E Speed brakes damage due to accidental actuation of the switch. E Damage.

TA-3B Improper packing of the drag chute resulted in a streamer. E Damage.

A-4B Improper security of an access panel. Was lost in flight. E Damage.

A-4E Improper securing of gas filler cap resulted in the cap separating from the aircraft and striking the stabilizer. E Damage.

A-4E A hurricane wrench was left in the wheel well causing E Damage.

A-4B The pressure relief ports were taped closed resulting in B Damage.

A-6A Failure to install landing gear safety locks prior to engine shutdown resulted in C Damage.

F-4B An improperly installed drag chute fell out on takeoff. F Damage.

F-8D The wing fuel cell was overpressurized causing rupture and C Damage.

S-2E Improper security of main access door caused inflight loss. E Damage.

P-3A Oil cap seal damaged during maintenance caused inflight oil loss. F Damage.

C-54T Improperly secured engine cowling allowed it to shift into the propeller. E Damage.

Other

A-4E Retracted the landing gear on the deck. The ground locks were removed. D Damage.

A-4E Failed to heed proper precautions during refueling. Fuel was ingested by the engine and fire resulted. E Damage.

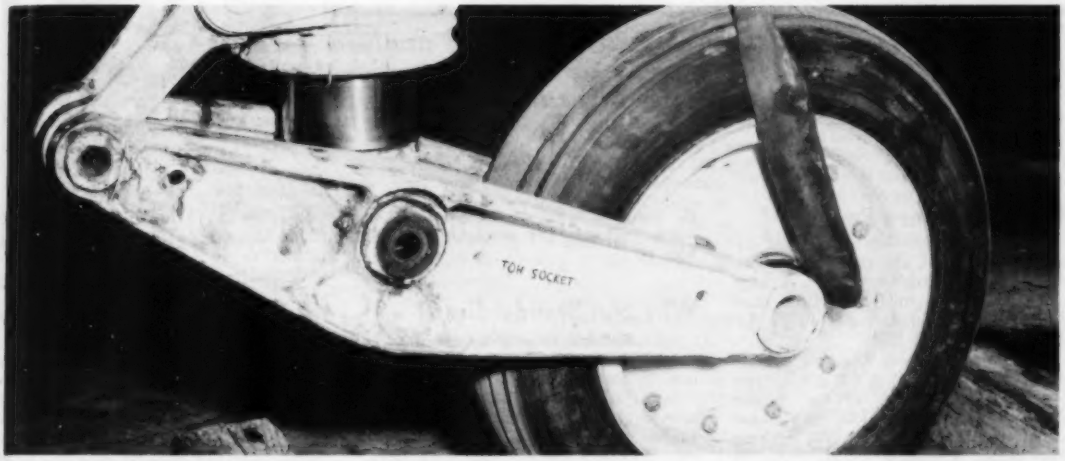
RA-5C A six-inch scale ruler was left adrift causing jammed controls. A Damage. *See photo page 43.*

F-4B A rag was left in the oil tank. The CSD generator failed. F Damage.

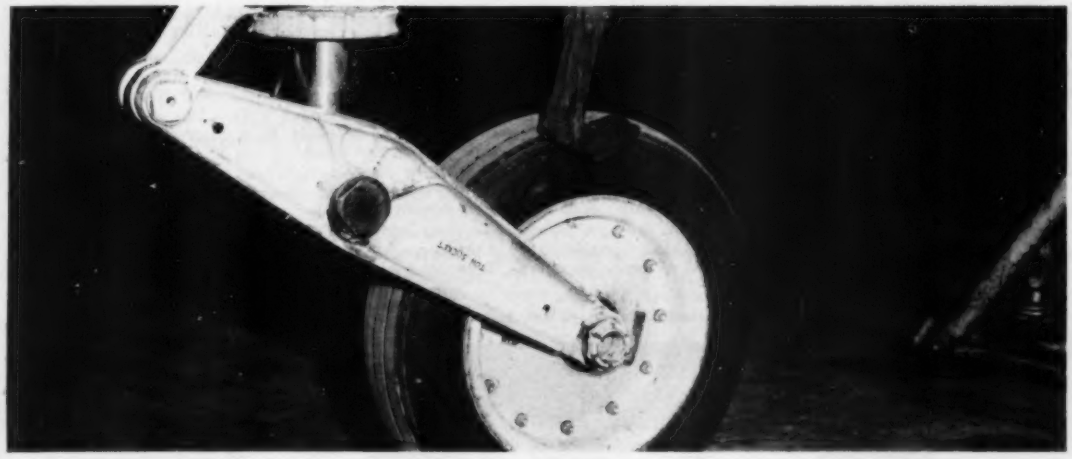
F-8E Fueled aircraft after repeated failures to obtain satisfactory primary and secondary preflight fueling checks resulted in D Damage.

F-4B Improper installation of a fuel transfer pump shaft seal caused utility hydraulic failure.

MURPHY'S LAW*



Correct installation of lever assembly.



Upside down installation of lever assembly.

NOSEWHEEL lever assembly, lower photo, installed upside down. Note stenciled words "tow socket" on lever assembly reading upside down. Although the nose gear retracted normally and seemed to function in a proper manner during drop-checks, the installation could possibly result in bottoming out of the strut, particularly on a carrier landing. With the lever installed thusly, strut clearance is reduced. The correct installation is shown in top photo.

—Contributed by LT L. Kuiper, VU-2

F-8 Murphy

*If an aircraft part can be installed incorrectly, someone will install it that way!

LETTERS

Want your safety suggestion read by nearly a quarter of a million people in naval aviation? Send your constructive suggestions to APPROACH.

Clip-Type Knee Pad

MCAS, El Toro—In search for an answer to the old, old question, "Where do I put my letdown plate?", I have come up with a small simplified knee pad that very satisfactorily holds the Terminal Letdown Book.

This knee pad was designed specifically for pilots wearing the girdle type G-suit on the outside of the regular flight suit, but some pilots have added a leg strap to the metal plate, making the holder adaptable to all types of flight gear. (See photos.)

Construction is very simple. It consists of a large binder clip, a type available in the supply system. This clip is riveted to a 2" x 8" piece of sheet aluminum. When not in use, the clip handles may be folded back, requiring very little storage space in the Nav bag.

These knee pads have been in use in VMT-2 for the past two years and pilots using them seem to agree that they are compact, convenient and functional.

GEORGE J. WELKER
MAJ, USMC, VMT-2

• Looks like a real handy gadget. Suspect a lot of jet pilots have been looking for something just like it.

Why Not Standardized?

NAS North Island—Pilot reactions to appeals for standardization are interesting, if not amusing at times.

In APMs a few pilots will invariably start squirming in their seats when the subject is brought up, hoping that if the NATOPS Officer asks any questions pertaining to standard operating procedures, he will direct them to someone else.

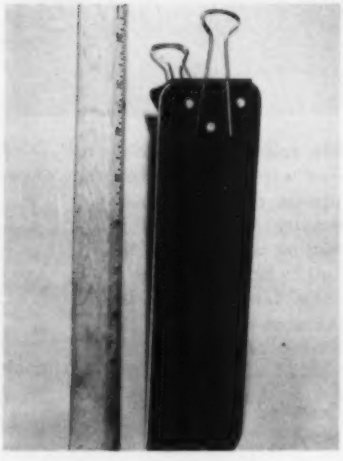
Unfortunately, there are a few pilots in most every unit who look upon the annual NATOPS check ride is a burdensome chore, to be completed as quickly as possible, with a minimum of effort and pain. Usually the people who feel this way revert right back to their "My Way is Better" attitude toward standard operating procedures. Thankfully, they are in the minority.

Do you have an active personal study program pertaining to your aircraft? As a proficiency type, how often do you study the *Beech*, T-28 or T-33 flight manual. Is there really nothing further to be learned about your aircraft and operating procedures or have you just become complacent and satisfied with your present level of knowledge and capability?

Practically speaking, common sense can never be replaced by standardization, but a clear cut understanding of standard procedures may certainly prove valuable in reducing your reaction time. Those 15 minutes a week spent studying emergency procedures might save the minute or seconds you'll need at some date to deal effectively with an emergency situation.

Why not begin your own personal NATOPS study program if you don't already have one? Need an impetus to study? Take a look at the mishaps that could have been avoided if the pilot had . . . or had not . . . reacted in a certain way. After such mishaps, someone usually raised the question as to why the pilot didn't respond correctly. Could part of the answer be that the pilot was not fully current on his emergency procedures?

Compact knee pad designed for use with girdle type G-suit.



It seems to me that every pilot should take the time necessary to acquire and maintain the level of technical knowledge expected of a professional Naval Aviator.

R. S. LANE, LTJG
VS-37

• Thank you. Education has long been considered the primary means of promoting aviation safety, and certainly self-study is an essential element of the educational process.

Oil Analysis Interest

Los Angeles—Request 200 copies of the March 1965 issue. Our particular interest is in the article by John M. Ward, "Spectrometric Oil Analysis," for use by our engineering instructors and for distribution to our Navy, Army and Air Force Students.

DR. JOHN M. ROGERS
COORDINATOR, AEROSPACE SAFETY DIV.
UNIVERSITY OF SOUTHERN CALIFORNIA

• Inasmuch as oil within a particular system continually interrogates that system, the analysis of the oil is an effective means of enhancing flight safety and component reliability. Your request along with many others has added oil to the need for reprinting this popular article. Reprints as requested are underway.

Oil Analysis Gains Attention

Washington, D.C.—Request 100 copies of the article "Oil Spectrometric Oil Analysis" which appeared in the March 1965 issue.

Copies of the article will be distributed to the 71 FAA certificated mechanic schools as instructional material in new processes and procedures. These schools are representative of private technical, public high schools, junior colleges, and colleges and universities.

The combined student graduation from these schools represents some 3000 mechanic applicants each year.

In addition, we propose sending a reprint copy to each of our carrier district offices so that they may bring the information to the attention of their assigned air carrier maintenance departments.

GEO. N. WEITZ
CHIEF, MAINTENANCE DIV.
FAA FLIGHT STANDARD SERVICE

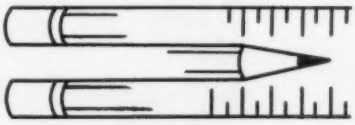
• Good show! Copies are on the way.

Field Fix Aid

NAS Key West—In order for field units to enlarge or otherwise reproduce the items shown in "Field Fix," page 44 of the May '65 issue, it is felt that a special "Perule" will be required. Accordingly, a drawing of the instrument is forwarded.

A. V. WILSON, LT
AMD ADMIN OFFICER

• The drawing of the "Perule" is reproduced herewith for those interested in trichometric indicator supports, excrusion brackets and ambihelical hexnuts.



PERULE

Takeoff Instructions Indeed!

Huntington, N. Y.—You fellows on APPROACH are making real good time, trouble is you're tuned to the wrong frequency.

I refer to an item in the April issue on page 18 entitled "Takeoff Instructions." You printed a fix for an unsafe type of tower transmission as follows: "You are cleared to take the duty and hold. Repeat Hold." An alternate fix was: "You are cleared to take the duty for takeoff."

Now if you can't come up with something better than that, you better close up shop for a few weeks for some R&R. The problem comes from a pilot hearing only part of the transmission or hearing it garbled. Remember some of us old fellers are slowin' down a bit, staying up nights studying that danged international phonetic alphabet and all, so make things as simple and easy as you can.

When I'm sittin' by the edge of the "duty" and have declared myself ready to go, all I have to hear is one of the following:

(a) Roger.
(b) Taxi into position
(c) Cleared for takeoff

When I say "ready for takeoff" and the tower answers with the word "Roger," I'll stay clear of the runway and say nothing.

When the tower says "TAXI into position," or "CLEARED for takeoff," I'm going to repeat it back to get it on the tape just in case of a foul-up.

I'll be the first to admit I don't even know the meaning of the phrase "you are cleared to take the duty for takeoff." Am I cleared to actually takeoff or not? Things are bad enough without needing to get a lawyer on the hot line to find out the implications.

OLE CAPTAIN

• Okay, so it wasn't such a good suggestion. We admit the key to the problem is found in ATP 7110-1B. Tower operators should use the word "TAXI" if there is to be a delay on the runway before giving "CLEARED" for takeoff.

Seat Check

NAS, Miramar—In VU-7 we help satisfy our ditching drill requirement by having the pilots pull the ejection seat check with the seat shop. The seat shop has to pull the face curtain, harness release handle, and canopy interrupter handle, so the pilot does this instead of the shop. We get comments such as "Man, I didn't realize that handle was that far!" The seat has to be checked periodically and each pilot is assigned an aircraft. For those left without an aircraft we have a dummy seat.

HARRY L. LANDRY,
ASO, VU-7

• Sounds like a good idea. We pass it along.

APPROACH welcomes letters from its readers. All letters should be signed though names will be withheld on request. Address: APPROACH Editor, U. S. Naval Aviation Safety Center, NAS Norfolk, Va. Views expressed are those of the writers and do not imply endorsement by the U. S. Naval Aviation Safety Center.

The APPROACH cumulative index covering issues from July 1962 through June 1965 are being distributed to all units receiving *Crossfeed* in the July Part I packet.

Additional copies of the index are available on request for libraries, manufacturers, and various non-Navy, government, industry and individual civilian and military subscribers. Write Commander, U. S. Naval Aviation Safety Center, Attention: Safety Education Department, Naval Air Station, Norfolk, Va., 23511.

Vol 11 **approach** NO 1

Our product is safety, our process is education and our profit is measured in the preservation of lives and equipment and increased mission readiness.

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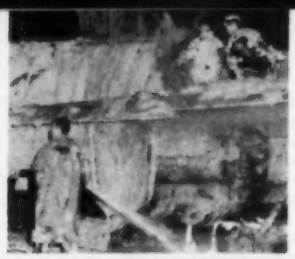

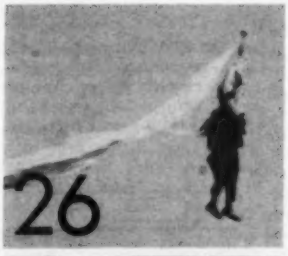

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Page 15 Diagram and photos courtesy the American Institute of Aeronautics and Astronautics

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"IT IS FURTHER RECOMMENDED THAT ALL PILOTS BE PERIODICALLY REMINDED OF THE DANGERS INHERENT WHEN THERE IS A FEELING OF COMFORT AND WELL-BEING WHILE OPERATING UNDER CIRCUMSTANCES WHICH REQUIRE THE FULLEST ALERTNESS OF ALL SENSES, FOR INSTANCE, A CARRIER LANDING. NO MATTER HOW GOOD A PILOT IS, OR HOW FAMILIAR HE IS WITH THE AIRCRAFT AND CARRIER APPROACHES, IF HE FEELS COMFORTABLE AND RELAXED, HE SHOULD BE ALERTED TO DOUBLE CHECK TO SEE WHAT HE IS FORGETTING."

—FROM AN AAR ENDORSEMENT.

CHECK LIGHTS BEFORE YOU LEAVE THE LINE